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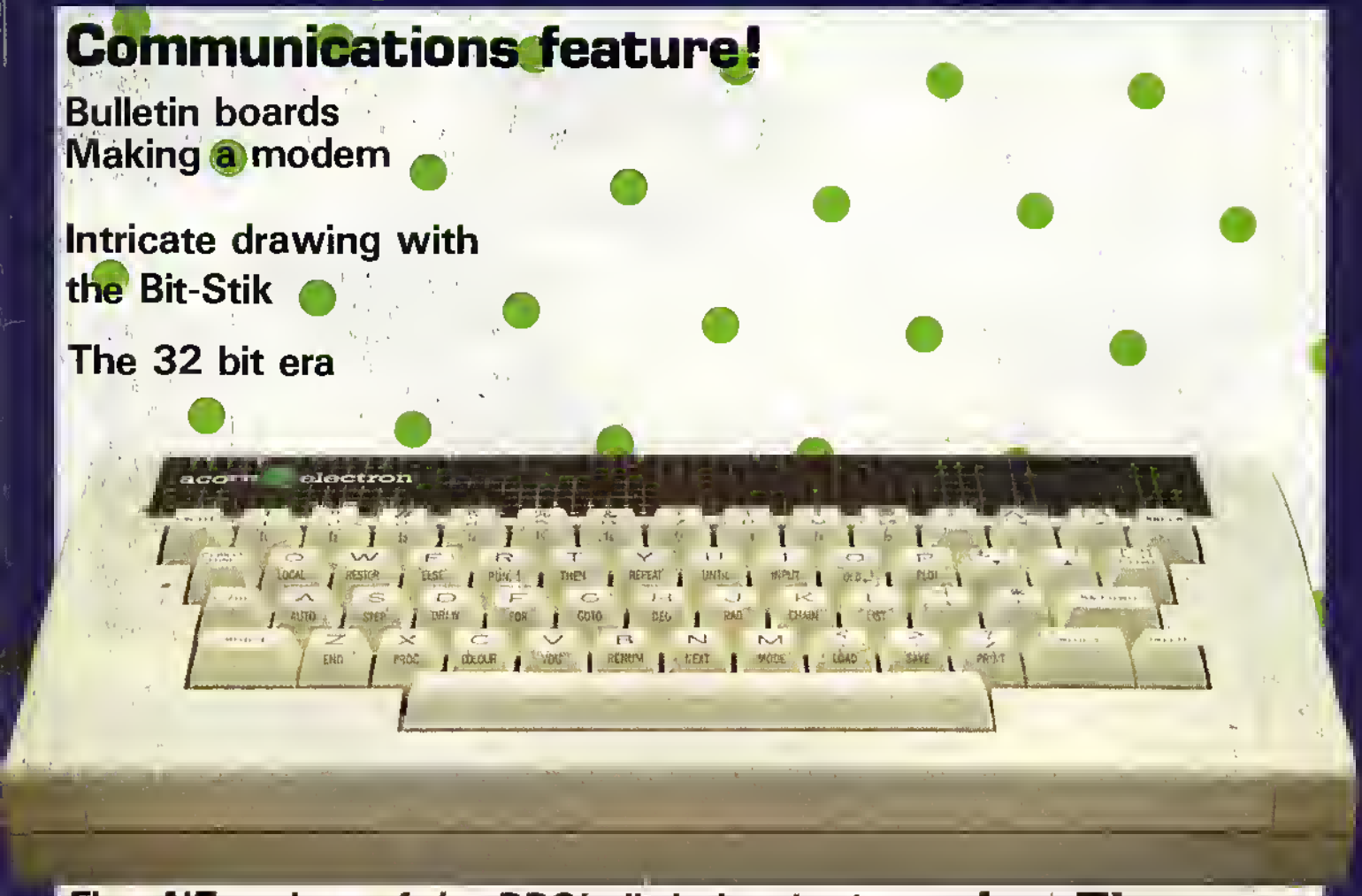

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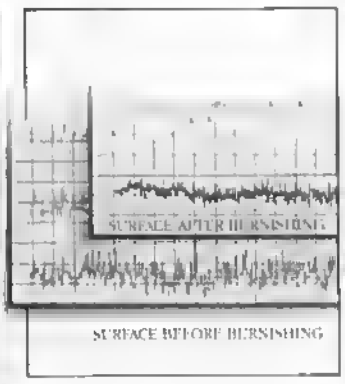

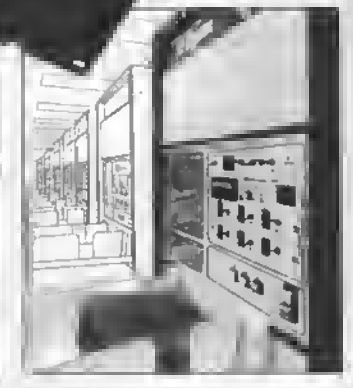

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BITS & BYTES

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COLUMNS

REGULARS

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25,000 readers can't be wrong!

At least 25,000 people read BITS & BYTES every month. This is one of the facts to emerge from our reader survey.

This depth of readership is matched by its width in terms of computer interest. While 57 per cent said their primary computer interest was hobby and home use, substantial numbers ticked business and professional use (23 per cent) and use in education (11 per cent).

It was interesting to note that almost half our readers find business and professional articles "useful" or "very useful".

We believe these figures justify the decision to make BITS & BYTES a personal computer magazine, not just a home computer magazine or a business computer magazine.

The figures support our belief that readers are, or over time will be, interested in more than one aspect of microcomputer use. Eor example, a person may initially be attracted by games but later move on to word processing, spreadsheets, and so on.

Thus we have provided coverage of all the major areas of microcomputer use and will continue to do so.

The mix of this coverage may change, however. A few survey replies complained about too many hardware reviews (although the vast majority of readers found these "useful or very useful"). We don't agree but we do agree there hasn't been enough coverage of software and peripherals. That will change this year.

Support from advertisers has increased dramatically as they have discovered the large readership of BITS & BYTES and the fact that our readers are market leaders and innovators. This support is essential if we are to continue to increase the quality and size of BITS & BYTES and we urge all readers to support BITS & BYTES advertisers and mention BITS & BYTES whenever contacting them.

Reader comments were generally favourable about the magazine, the biggest bug-bear being articles continued several pages on. We try to avoid this but inevitably one or two articles a month will be affected.

In all, we received 2100 survey forms back of which 1000 were independently processed by Dr T. Barker, a senior lecturer in marketing, at the University of Canterbury.

We don't wish to reveal too much more here (the survey was designed to help us, not our competitors) except to say we now have a clearer picture of what you want to read and intend to provide just that. In most cases you will also read it first (if not only) in BITS & BYTES, as several new computers will be reviewed first in the magazine this year. So keep on reading.

A breakdown of reader demographic statistics is available to advertisers on application.

Life agent package

Sirius Systems Ltd has developed a software package to assist life insurance agents. It will be marketed by Sirius under the name Prompt and is designed to manage the agent's contacts with clients and potential clients.

Prompt is designed to operate on the Osborne portable microcomputer.

The system maintains information under three categories:

Suspects, who are people with whom no actual contact has yet been made, but with whom the agent is endeavouring to establish such contact.

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The agent can select a subset from any category on the basis of age, area, financial status etc, and provision is made for producing mailing lists for use with WordStar word processing system.

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Dick Smith pounces on Apple

Hard on the heels of releasing an IBM compatible computer (although it is not yet available in New Zealand), Dick Smith Electronics have announced an Apple IIe "work-a-like" in Australia.

The Dick Smith Cat is made in Japan and is expected to sell for about a third the price of an Apple IIe.

In New Zealand the price is expected to be $1295 for the standard unit.

It will be able to run about 70 per cent of existing Apple II software unchanged and can be expanded with an emultator (expected to cost around $200 here) that increases the degree of compatibility.

The Cat has 32K bytes of ROM memory and 64K bytes of RAM. An 80-column capability is standard and the machine has 81 keys on its keyboard versus the 63 keys on the Apple IIe.

At the price rumoured in the reports the Cat is likely to take a large share of the market. It is not expected to run into difficulties with Apple copyrights.

Watch for the review in 8ITS & 8YTES.

South Korea

South Korea's big four electronics companies are planning to get into microcomputer exports. In 1983, about 50,000 personal computers were sold in South Korea, the first year of production. Two brands are on the market, Samsung and Gold Star, each with three models. Daewoo, and Hyundai, the huge industrial firm in everything from construction to cars (its Hyundai Pony is on sale in New Zealand) also plan to begin producing computers this year. To gain technology, the Korean firms are looking to joint ventures with American corporations. Last year South Korea exported computer equipment worth more than $NZ74 million. By 1986, the South Korean Government expects annual computer exports to be worth close to $NZ900 million.

High-speed chip

IBM researchers have developed a 64K memory chip that works with unprecedented speed — between 16 and 20 billionths of a second (nanoseconds). Most present 64K chips have access speed of 70 to 300 nanoseconds. The new chip also can discharge its information in blocks of 16 bits at a time.

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IBM compatibles

American computer dealers are using Lotus 1-2-3 and a Flight Simulator, by Microsoft, to test the dozens of machines which are claiming compatibility with the IBM PC. The *Wall Street Journal* quotes Mr Jack Hooper, president of a Washington computer-store chain, as saying: "Lotus 1-2-3 literally exercises every hardware feature of the IBM PC. That's not a 100 per cent guarantee (of compatibility), but it's as close as you're going to come". Mr Joe Harmon, president of a computer-shop chain in Texas is quoted as saying he tests compatibility first on running Lotus "straight out of the box", then on Lotus graphics, and finally on whether it will run the IBM PC's Flight Simulator.

IBM PC add-ons

An IBM PC add-on market is appearing in New Zealand. This comes after the huge growth in this market overseas and it should be further stimulated here by the release of a number of IBM PC compatible and partly compatible computers this year.

One particularly interesting add-on is Quadlink, a plug-in board that allows the IBM PC to run Apple software thus opening up a whole new software library. The New Zealand agent is Anderson Digital Equipment (offices in Auckland, Wellington, and Christchurch).

A number of other add-ons are available from Skellerup Microsystems (P.O. Box 19-64B, Christchurch). These include:

PC-Net — A local area network allowing multiple PCs to be cable connected and share resources. Price $1794.

AST-6 Pack Plus — A board that provides memory from 64K to 384K plus Async adapter, clock/calendar with battery check-up, printer adapter and game port. Price $788.

Colmon — Plugs into the back of the IBM colour/graphics adapter card to give graphics capability on an IBM monochrome screen. Price $252.

Sweet-P Plotter — A colour graphics plotter. Price $1713.

IBM portable

IBM is to sell a portable version of its Personal Computer, which will put pressure on many of the look-alikes on the American market. The portable has a 9in amber screen and in standard version 256K main memory and a single disk drive. At 30lb it will be heavier than some of the look-alikes but the retail list price in America is $US2795, slightly under the list price of the top-of-the-line main competitors.

And a network

The IBM Corporation has also announced in America a new network system, the Personal Computer Cluster Program, which in a typical package that would link five IBM personal machines, will retail for $US2540.

Take-over

Computer Consultants Ltd, has taken over the assets of Data Control, Ltd, a wholly owned subsidiary of United Publishing and Printing. Data Control Ltd, which employs about 20 people, has a micro-software unit in addition to providing bureau services.

Timex out

Timex, the big electronics firm controlled by the Norwegian shipping magnate, Fred Olsen, is another corporation to withdraw from manufacturing home computers. It made Sinclair products in North America.

Mousers show interest

A number of people have expressed interest in the Wellington Micro Computing Society's micro-mouse competition.

Micro users from two Wellington technical institutes have made inquiries with a view to a possible class exercise, according to society spokesman, Bill Parkin.

And a Christchurch man who has a line-following machine is interested in modifying it to a micro-maze type of mouse.

The society has organised a May get-together of interested parties to give them an idea of what is going on. No date has yet been set for the final contest, Parkin said.

[Those interested can make contact via the Wellington Micro Computer Society

U.S. magazines

Some interesting circulation statistics on American computer-magazine circulations: *Personal Computing* is way out in front with more than half a million copies a month. *Computers and Electronics* is next with more than 450,000 copies, followed by *Byte*, with more than 400,000 copies. Of magazines for specific brands, the IBM magazine, *PC World*, leads the field followed by *99'er Home Computer* (Texas Instruments) and then *Softalk* (Apple).

BBC price cut

The retail price of the BBC microcomputer has been reduced by $300 and is now $1699.

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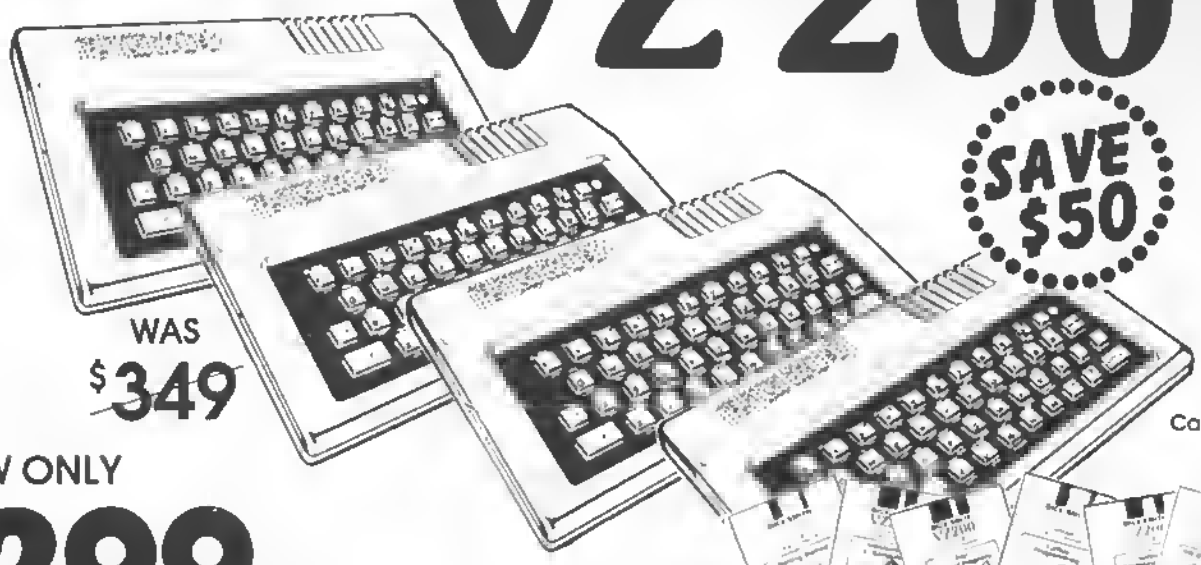
The Dick Smith VZ 200



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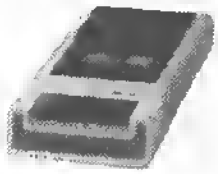

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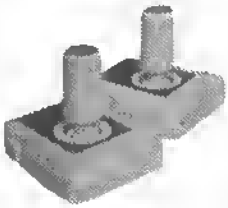

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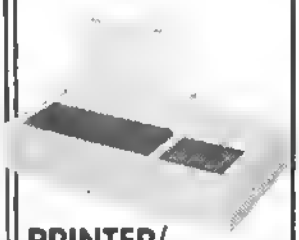

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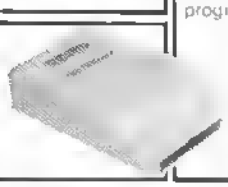

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New Sharp model

A new Sharp computer, the MZ-721 Family Computer, has been released in New Zealand by Excelsior Supply Co (P.O. Box 16063, Wellington). Priced at $995 the MZ-721 has a typewriter keyboard, 64K of RAM, and a built-in data recorder. Space is also included in the standard unit for a four colour plotter/printer costing $325 to be fitted.

The MZ-721 can be connected to a television set or monitor and displays 40 characters by 25 lines and has a graphics capability of 80 by 50 piels (eight colours).

Unlike some other new computers on the market, the MZ-721 does appear to have a reasonable amount of software already available for it with approximately 50 titles listed. Future enhancements will include twin disk drives, joy-sticks, C-MOS RAM and 80 and 132 column printers.

ICL 16-bit

ICL, recently in the news because of staff lay-offs in New Zealand, has introduced a 16-bit personal computer with a colour terminal facility and with a multiple-user version of CP/M-86. Up to four tasks can be run concurrently from one work station. "For the first time you can write text while printing other documents while another user can be looking at directories without leaving his application program. Still another user can also be editing programs while the computer compiles," said an ICL spokesman. The 16-bit machine will come in two versions: one with twin floppy disks of 256K RAM, synchronous communications, six input/output ports, multi-user CP/M-86 and personal BASIC; the other with a 10Mb hard disk instead of the diskettes.

Optical disks

Sony, of Japan, says that by the end of this year it will be selling equipment that will read both audio and video disks. Optical disks hold great promise for microcomputers, as they can hold up to 55 megabytes of information (the equivalent of 500 of the new 3in floppies). Sony, and Philips, of the Netherland, have reached a common standard for the disks. Sony expects that by 1986 it will have available, in one box, the capability of reading audio, video, and data storage.

Microdrives

The long awaited microdrives and interfaces for the ZX Spectrum are now available in New Zealand. But the expansion will cost Spectrum owners up to $800 as each microdrive costs $395 and Interface I, required to link the microdrives to the computer, also costs $395. Interface I can take up to eight microdrives (minimum capacity 92K each) and also has an RS232 port for a printer and the ability to link 64 Spectrums in a local area network.

Also available is Interface 2. This costs $99 and allows 48K ROM cartridges to be plugged-in and two joy-sticks to be added (at extra cost). About 10 cartridges, all games, are currently available.

Both interfaces are compatible with 16K and 48K Spectrum models.

The microdrives take three seconds to load a 48K program and a maximum of nine seconds to search for data.

Corona availability

The Corona microcomputer's availability in New Zealand has been assured by the outcome of an American law suit. IBM charged that Corona Data Systems had copied the IBM PC's input-out system. The suit has been settled with Corona agreeing to make a slight change to its operating system. The new ROM is already in production.

B20 sales

Burroughs says that more than 200 of its B20 Burroughs micro-computers have been sold in New Zealand. Specialist software developed for the B20 includes packages for lawyers, the manufacturing sector, wholesalers and distributors, chartered accountants, contractors, and local bodies.

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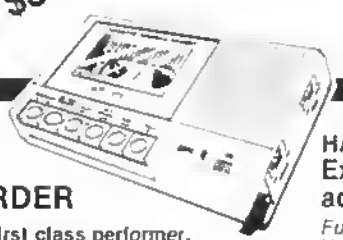

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Telephone plus micro equals a new world

By Selwyn Arrow

Is your computer feeling a bit lonely these days? Does it sit forlorn in the corner because the family have tried out all the games in its library? Perhaps you would like to experience something different with your computer for a change? Telecomputing has now arrived in New Zealand so how about expanding you and your computer's horizons by combining the usefulness of your computer with the access of the telephone.

Since January, Auckland microcomputer enthusiasts have been able to dial into a Remote Bulletin Board System (RBBS) to 'read' messages and bulletins on a variety of subjects, to 'post' for sale advertisements, and transfer programs to and from the RBBS host computer.

This is made possible by the use of a device that couples the digital signals in the computer to the audio signals of the telephone. Called a modem (MOdulator/DEModulator) this device comes in a variety of coupling methods and a range of prices. The type in most use at the moment is an acoustic coupler. This connects to the RS232 port of the computer and a telephone handset is pushed into rubber cups to provide a non-electrical (acoustic) connection to the telephone.

To use this device the RBBS number is dialled on the telephone. When the ringing stops and a tone is heard the handset is placed firmly into the coupler.

Unfortunately, there are a few problems with this device. It is likely to pick up room noise which can garble the received message and the microphone in the handset is itself a source of noise at times. Despite these problems the acoustic coupled modem is the only real option at the moment for home and hobby use. It does have advantages over the alternative: it is readily available, portable, and cheap. Prices range from around $800 for a commercial model to $150 for an assembled and tested circuit board that needs a case, cables, connectors, power transformer and rubber couplers to make it ready for use.

The only alternative available to us, at the moment anyway, is to hire a direct coupled (DC) modem, called a Datel set, from the Post Office for an installation charge and a two monthly rental of $60; in addition you will also need to pay business rates for your phone. This situation is most unfortunate as most overseas administrations provide for type approval of equipment to be connected to the telephone system so that it would be possible to buy a DC modem that just plugs in to the phone line. There are many advantages in using a DC modem. No microphone noise is picked up as the phone is disconnected. Control signals can be sent from computer to modem to automatically dial any number. The modem can even automatically answer incoming calls to provide your own RBBS service.

RS232 port and program needed

Whichever type of modem you use you will need a serial port, preferably RS232, plus a communications program to provide communication between computer and modem.

Unfortunately, some personal computers still do not have an RS232 port fitted as standard. These include the TRS-80, System 80, Apple, VIC-20, and early Commodore computers. These will need to be fitted with an expansion unit or plug-in board to allow them to operate with a modem. Some computers such as the Atari 400 have a joystick port which can be pressed into service.

Most computers released in the last couple of years such as the Commodore 64 and MicroBee plus many earlier small business computers have an RS232 port available.

Two types of communications program are available for most computers: Dumb and Smart. A dumb-terminal program would provide a means of sending characters from your keyboard and displaying incoming characters on your screen. Usually some of the more advanced features are also included, such as the ability to load programs.

A smart-terminal program is more complex, allowing text to be prepared in advance of transmission, placing selected information in a buffer for later saving to disk or tape, or even echoing the session to a printer if desired.

Many other options and commands are usually provided. For instance, my program interacts with my word processor for complex editing. I find this great for long messages. I have been able to save chunks of a session and later edit them for inclusion in the club magazine as a guide for new users.

There is a wide variation in price for these communications programs. Some simple ones can be typed in from magazines, while others are available commercially for about $100. Price alone is not an indication of usefulness. Some of the better programs have been written by enthusiasts and placed in the public domain, free for all to use non-commercially. Several of these are available from User Group libraries or even via RBBS.

In many cases to 'download' such a program all that is necessary is to use a very simple dumb terminal program! These programs are of course very specific to each brand or model of computer so the best way to tune-in to such software is to join a computer club.

Your own secret password

The RBBS is a special communications program that controls a sophisticated host computer and an auto answer direct connect modem. When contact is made it will send you a sign-on message and ask for your 'username'. If this is your first time on the system it will ask a series of questions about your computer and your address and then request you to enter your own secret password. This is necessary to prevent unauthorised use of your name and files on the system.

On successive calls the RBBS will recognise you and ask for your password. This is the only time it will not echo your input back to your screen so that your password remains secret. The RBBS then searches your file to see if anybody has left you a message, if so it will give you the chance to read them before requesting the input of a command to proceed.

Depending on the system, there are many functions and commands available. One of these would be to check if any items are addressed to

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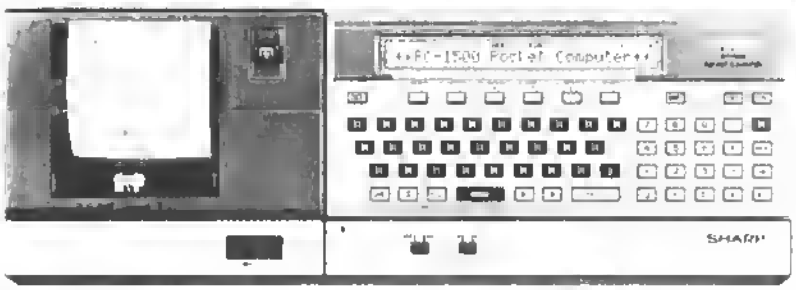

PC-1500/CE-150
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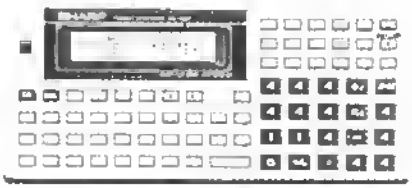

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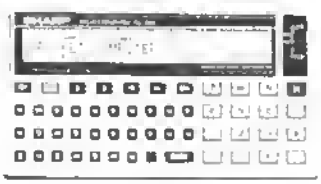

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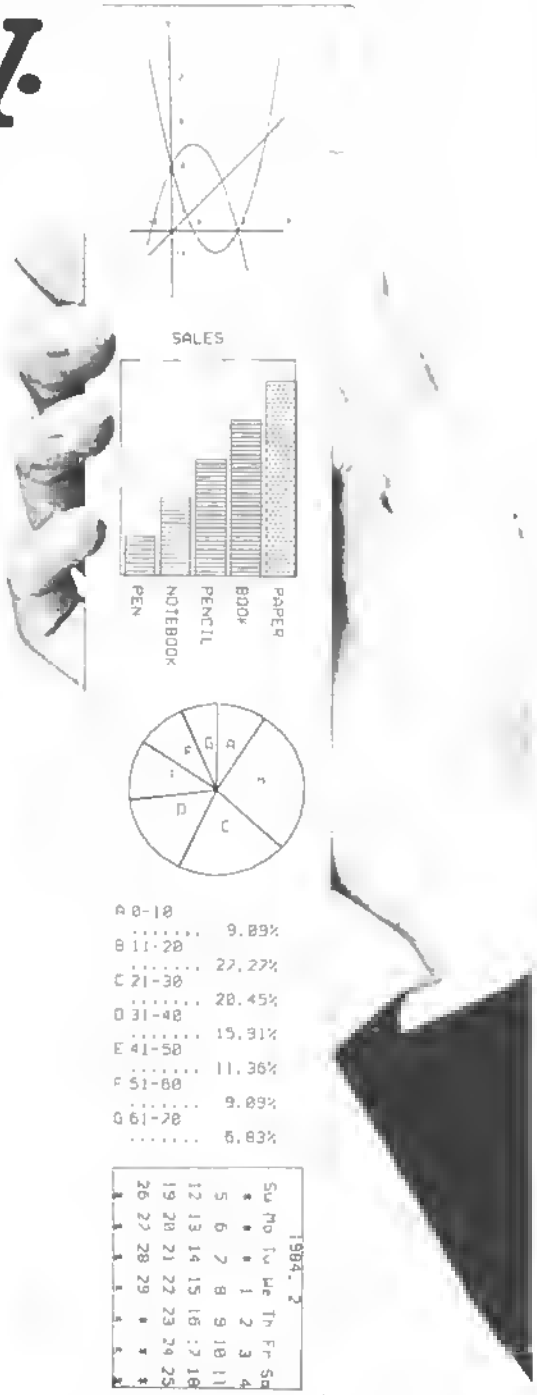

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All. This is a special function of such a system, to be able to send messages for all (or even a particular group) to read and act upon. For instance, the Attache Systems RBBS in Auckland now has up-to-date information on most local club and user group activities, a for-sale section, and even a message detailing computers and peripherals stolen in a recent robbery.

At any time you can type 'help' to get a summary of commands such as 'scan' (summarise), 'read', 'enter', 'kill', 'answer', or 'forward' (send with comments) any message. There are usually commands to check a particular bulletin board contents, find the user names of other 'users' to send them messages, and of course 'bye' to log-off.

These are just a few of the available commands of a typical RBBS. Other functions would be to 'download' programs from a user group library into your computer. If this program originated in a computer similar to your own then it can quite likely be run with no modifications, otherwise it can usually be edited to your own dialect of BASIC, etc, before saving and running.

Of course these programs would need to be 'uploaded' by someone else in the first place and the more this is done the better the choice. It is even possible for the same program to be modified for several different computers then uploaded to be available online. The 'download' feature alone can recoup the cost of your modem in no time at all.

Conferences held over months

As if that is not enough, the boundaries of telecomputing are wide open. For instance how about a conference on some topic of special interest where the participants do not have to find time to meet face-to-face. Teleconferencing takes the form of a session or forum via the RBBS where each person checks in when they have a few minutes to spare to see what others have contributed on the subject. They then add their own comments and observations on the topic at their leisure. Several conferences have been known to last months, with summaries of previous discussions provided from time to time to save everybody having to wade through tons of words.

In the United States there is a specialised program called The Conference Tree which runs on an Apple computer. It uses a tree structured (hierarchical) database of messages divided into categories and sub-categories to allow easy access to a particular item for people new to the system.

Such a dedicated set up is possibly too advanced for us yet, but several forum subjects are already appearing on the Auckland system. Subjects suggested so far are Games, Adventure hints, Technical help, and, of course, Communications.

Another worth-while use for the RBBS and modems is as a means of communication over the phone for someone who is deaf. Can you imagine being able to communicate only visually, and how much it would mean to be able to use a computer and modem to call a variety of people, all with different interests for a chat session or even for assistance?

For further information on the Auckland system you are welcome to dial (09) 762-309 (modems only), or to write to the NZ Microcomputer Club Inc, PO Box 6210, Auckland for membership information.

Wellington bulletin experiment

By Pat Churchill

The Wellington Micro Computing Society has the chance to undertake a bulletin board experiment. A Wellington printer has offered time on its LSI 11-23.

The system, operated by Bryce Francis Printers, is equipped for computer typesetting with input from a variety of floppy disks. A more recent feature has been the auto answer modem set up to accept material straight down the line. This is configured to operate on the same standard as the Post Office's Oasis service.

The society has been offered facilities for short-term experimentation with a view to developing a billboard system although to date progress has been limited, according to a spokesman, Mr Bill Parkin.

"We recently had contact with the Auckland group regarding cheap acoustic modems," he said. Mr Parkin runs a CP/M based machine which can act as a terminal and trap whatever is coming down the line to a disk file and to transmit from a disk file, but does not as yet have the software to convert the machine to act as a terminal.

Bits & Bytes readers will be kept posted on progress.

If its micro news in Wellington — telephone Pat Churchill, 797-193.

Phreakery on bulletin boards of America

By John MacGibbon

Ever wonder what happened to the freakery of the "Sixties? Was it totally replaced by button-down conformity among the youth of America?

Well no, Fritz the Cat's syndrome is still with us, only today heads are more likely to be turned on by microcomputers. Even Timothy Leary, who once exhorted everyone to "turn-on, tune-in and drop out", now has an IBM-PC and modem, and invites the populace to join the network nation: :"Turn on, tune in, and communicate."

They're tuning in, all right, to commercial services such as the Source and Compuserve. But many prefer the fast expanding grass-roots network of tiny systems based on private electronic bulletin boards. Hundreds, possibly thousands, of these bulletin boards are run by their own sysops (systems operators) out there in the American electronic heartland.

The boards act as local clearing houses for public notices, messages and discussion. Some cater for general interests, but most are special interest boards.

These interests are not always strictly kosher. Recently a number of New Zealand Apple users have taken a fascinating glimpse into the darker side of American telecommunications, thanks to the circulation of floppy disks full of text files downloaded from bulletin boards devoted to the ignoble arts of software piracy and phreaking.

Software piracy is, by now, a well-understood quantity. Phreakery, which is less well-known, is defined as:

"The systematic (or at least semi-determined) attempt to crack open, and/or break into and gain access to a computer system which the phreaker does not have any real right to be accessing."

Source: The Jolly Roger bulletin board.

Anyone who has seen the movie, "Wargames", will know what it's all about.

```
-----------------------------------
          THE JOLLY ROGER
-----------------------------------
     [PRESS SPACE BAR TO END LISTING]

*------------*   A=APPLE TIPS
!B.B. ACCESS !   B=OTHER PIRATE BBS
!'S' = SCAN  !   C=CHAT W/JEAN LAFFITE
!'P' = POST  !   D=PILFER SOME BOOTY
!'R' = REMOVE!   E=SEND NOTE IN BOTTLE
!'&' = SELECT!   F=MUTINY (FEEDBACK)
*------------*   G=GENERAL SECTION
H=S.O.S. (HELP)  I=SHIP INFO
J=DISC STUFF     K=KRACKING KORNER
L=PIRATE STUFF   M=OTHERS ABOARD
N=SET NULLS      O=WALK THE PLANK
Q=GAME STUFF     T=TIME ABOARD
U=CASE CHANGE    V=VIDEO WIDTH
W=CLIMB ABOARD   X=EXPERT PIRATE
Y=PIRATE STATUS  Z=SYSTEM NEWS
```

The Jolly Roger menu

According to "Cruncher II", the Jolly Roger's sysop, phreaking is an offshoot from the activity of "freaking out" phone companies with black or blue boxes. These boxes are devices used to make toll calls without paying for them.

Needless to say, the phone-freaking fraternity took to microcomputers and modems like ducks to water.

Cruncher II warns his audience that the legal situation is shaky at best, but says the worst penalty he's heard of for *computer* phreaking is five years probation meted out to an English enthusiast for making an obscene phone call to a local bank's computer.

However, he warns that *phone* phreaking is more serious: "Ma Bell [nickname for America's private telephone system] is an active prosecutor, and she doesn't fool around, she goes for the throat." (Would-be phreakers in New Zealand can be assured that the NZPO has a similar taste for the jugular.)

Cruncher concludes his somewhat amoral introduction with a warning to play it cool. "If phreaking sounds like it's for you, by all means feel free to join in. If not, leave the phreakers alone with their phreaking and refrain from leaving derogatory notes criticising phreakers," he pleads.

The Phreaker disk files contain an enormous amount of material left on the bulletin board for the benefit of the phreaking fraternity.

Jolly Roger's sysop kicks off the electronic discussion with information on logging on to systems in the Telenet directory. He lists 150 numbers, many for sensitive organisations such as Warner Communications systems, Burroughs NYC Data Centre and the Bankers' Trust Customer Service.

A character calling himself Z-80 CPU is a fund of information on how to log on to private systems. He suggests methods for defeating protection against unauthorised access, and discusses modifications which will free the systems up for fellow phreakers.

Most of the messages are cryptic: don't expect literacy gems or long explanations in Z-80 CPU's world. Example: "CHDNCO usually has no password, and you just 'LOGIN CMDCO' to get in."

On October 19, the Devil Himself calls, with a long list of what he claims are the only true full duplex access port numbers in Houston. He signs off with a declaration that if he doesn't get something in return, the bulletin board will hear no more from him.

The warning works, and a couple of days later the devilish phreaker comes back with the following message:

"Note on the use of credit cards. Find your credit card # on a pay fone, then use it at home!!! once !!! It takes them two times on the same fone to trace them correctly."

Freak King logs on and leaves a series of "interesting" access numbers. He tantalises the Jolly Roger audience with the information that he has

". . . 30 mor like that, but not for public distribution. OK guys, now let's see some "real" phreak action – like has anybody got the

bank numbers. I got Bank of America and some others, but looking for Sears, and some others.''

The Executioner calls with access and authorisation numbers for the Stamford CT. He's also asking for a password to the Source – just for a day. He thinks he can create some accounts of his own and says he and a friend crash their school Prime all the time. Nice fellow . . .

Someone named Keypulse posts the following message:

''Here are the frequencies for the MF System for those of you who have not come across them. But be careful. . . Remember the earlier message. Ma Bell does go for the throat. Do not use from your home on any regular basis. You will likely be spotted unless you have a method to hide it.'' (Information follows)

Security is a constant concern. (Security for the phreakers, that is – let's not get conscience-stricken about private computer systems.)

The Hacker warns users he's found out that the FBI, Bell and local people are looking for blue boxes in the Houston area, so ''better hide your boxes''. The sysop himself wonders if, due to the (ahem) delicate nature of its activities, the Jolly Roger should become an ''anonymous caller'' board.

Most messages left on the board are directly concerned with phreaking, but not all.

We are told by one Merrick Johnson, of Collossal Cave Maintenance, that calling 660-8159 and typing ''collossal'' gets you into the best adventure game ever designed for a computer.

Our old friend, Keypulse, wants to know the whereabouts of Doorbell, formerly of New York. Keypulse also asks if anyone has a tape of a 12-year-old program from an underground radio show dedicated to the memory of Dom Tuffey, a New York telephone security man who was legendary in the early days of blue boxing.

The bulletin board also contains a good many standard Apple programming tips, plus some advanced software-cracking techniques, supplied mainly by a fellow by the name of Krackowicz.

The Jolly Roger is by no means the only bulletin board operating in the dubious electronic netherworld.

Cruncher II thoughtfully supplies the names and numbers of no less than 31 other boards devoted to nefarious activities. There are probably many more. Undoubtedly some have become anonymous caller boards, while many of the listed boards appear to be specialist Apple boards. What are all those IBM, Atari and Commodore users up to?

One thing is for sure: this activity will spread to New Zealand, and the problem of security for personal information held on private databases will become an important issue. Will we look back with nostalgia to the days when the Wanganui Computer Centre was the extent of our worries?

Next month John MacGibbon will look at the role of bulletin boards in software piracy.

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KRAKOWICZ'S KRACKING KORNER THE BASICS OF KRACKING I: ROMS AND PROMS AND FB'S

THIS SERIES, WHILE AIMED AT THE BEGINNING TO INTERMEDIATE KRACKIST, WILL STILL ASSUME A REASONABLEKNOWLEDGE OF ASSEMBLY LANGUAGE. IF, ON THE OTHER HAND, YOU FIND THAT THISIS ALL BENEATH YOU, JUST KEEP A KNOWINGSMIRK ON YOUR LIPS AS YOU SKIP LIGHTLYOVER THESE EPISODES – THERE MIGHT BESOMETHING YOU MISSED BECAUSE YOU HAD A BAD HANGOVER ONE DAY IN KRACKING 101).

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Introduction to Krakowicz's Kracking Corner

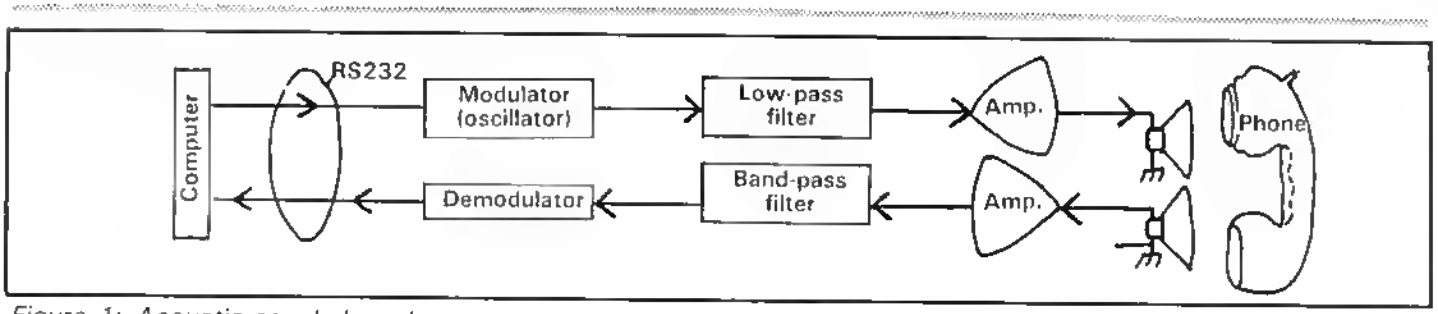

Figure 1: Acoustic-coupled modem

Buying or building a modem? Some tips

By Jay Mann

So you want a modem to link your computer with the outside world! Other articles in this issue of *Bits & Bytes* will tell you about the advantages of such link-ups. I will try to summarise the advantages and disadvantages of different modem designs, and discuss whether you should buy or build.

Begin by making a short list. Consider:
(a): The state of your bank balance and/or the friendliness of your bank manager.
(b) Your ability with a soldering iron.
(c) The urgency with which you need to get into operation.
(d) How important error-free transmission is to you.

It is possible to build a modem from scratch. (I'm an expert on this . . . on the same level as Mark Twain, who was an authority on giving up smoking because he'd done it so many times.) However, building a modem that is stable and reliable is quite another matter. To understand the difficulties, a bit of technical information has to be surmounted (see Figure 1). You may be interested in some of this data even though you don't plan on building your own modem, since it may save you from costly errors and will at least give you some appreciation of what goes into the design of a seemingly simple circuit.

In New Zealand, Australia, and Europe, 300-baud modems have to fit the CCITT V21 standard. This standard specifies a well chosen set of frequencies that are definitely **not** the same as the Bell 103 modems so popular in America. If you manage to import an American modem, it will **not** give you access to any New Zealand networks, nor will it even get you through the New Zealand phone network to any of the United States databanks.

Even should you find someone else with another American modem, your communications will utilise frequencies that in New Zealand are reserved for "supervisory" functions, such as long-distance tolling. So anyone with an American modem will be left out of the local action, and can expect a serious discussion with a Post Office inspector at any time. It is unfortunate that most of the new generation of American computers with built-in modems, can only operate at the Bell 103 frequencies that are unsuitable in most of the world.

What are these frequencies? Actually there are two pairs of frequencies, because two-way communication is involved. In a "full duplex" system, both your computer and the remote computer talk simultaneously. In "half-duplex" links, one terminal talks and displays characters on its own screen without waiting for an echo. Then the talker shuts up and the other party begins to talk. Full-duplex is more useful.

The CCITT standard specifies that the device or computer originating the conversation should transmit on the lower channel at frequencies of 980 and 1180 Hz representing '1' and '0' respectively. Thus the large "host" computer need only have hardware for the receive channel at 1650 and 1850 Hz.

This brings us to one of your first decisions: can you settle for a modem capable of transmitting only on the lower (originate) band, or do you need one capable of working in either originate or answer mode? If all you plan to do is to link with a large computer or information network, originate-only will be sufficient. However, if you want to swap programs with your computer-owning mates, at least one of you must own a modem that can generate the upper channel signals.

Computer's link with modem

Now let's work backwards, starting at the computer-to-modem connection, until we reach the phone network. The standard way of attaching a computer to a modem is through the RS232 standard. RS232 refers both to a set of voltages and, usually, to an expensive 25-pin connector, in which only three to six pins are normally wired up.

Almost invariably commercial modems will utilise the 25-pin connection, but if you are devising your own connection to the computer a cheaper three or five pin DIN plug is satisfactory. Don't buy a 25-pin plug until you actually have the modem in your hand: there are both male and female versions for both socket and plug.

Furthermore, don't buy a pre-wired modem-to-computer cable unless you actually see it working in your system. Because of some confusion in the RS232 standard, you may find that the transmit/receive connections on pins 2 and 3 of the modem need to be swapped over. Commercial modems supply extra information to the computer, but most personal computer software disregards the additional signals.

It is your computer's responsibility to feed the modem with serial information, bit by bit, at a rate of 300 bits per second or 33 milliseconds per bit. Some computers have this serial port built in, but others will need additional hardware. You will have to check with your local dealer or users' group to find out what serial hardware is needed for your computer.

It is sometimes possible to use computer software to toggle the tape recorder output voltage at the correct rate. (There is a program for the TRS80 to accomplish this.) The trade-off is that the system cannot do true full-duplex communication. Instead, it transmits one character,

then checks to see if anything is coming in, and if not goes ahead and transmits another character.

The actual voltages for RS232 are from −3 to −12 volts for '1', and +3 to +12 volts for '0'. (Note that careful regulation is not important within this range!) If your computer has only a positive power supply, it might be worth trying a +5 versus 0 volts linkup to the modem. Most RS232 receivers block off negative voltages, and at 300 baud "settling time" will not be important. For home-built modems, a TTL linkup is likely to be quite satisfactory. Optical isolation may be advisable to protect your computer against a modem failure that could produce high voltages.

Next we come to the signal generator. Its task is to provide the 980/1180 or 1650/1850 Hz sine waves, depending on whether it is an originate or answer mode, and whether a '1' or a '0' is to be transmitted. Change-over from '1' to '0' should be smooth and glitchless. Numerous oscillators have been used, such as the 566 voltage-controlled oscillator, and the XR2206.

The receiver or demodulator is another matter! The sort of chips and circuits that work in amateur radio at a leisurely 50 baud rate simply aren't good enough at 300 baud. (In fact, the CCITT standard merely guarantees reception at 200 baud and leaves it up to each national phone service to determine whether to give it a go at 300 baud!)

Remember that for the lower channel of 980/1180 Hz, a 300 baud rate means just over 3 milliseconds per bit, i.e., the circuitry has only three cycles to decide whether it has received a '1' or a '0'.

The leading contenders for the job are the XR2211, the Am7910, the 14412, and the 565. The latter two are really not in the race: the 565 because it is not stable enough, and the 14412 because although it is a well designed digital detector used in American equipment, it is poorly suited to 300 baud New Zealand operation. The XR2211 costs something like $10, the 7910 more than $100. The latter, however, is a complete world-modem on a chip. It is able to transmit/receive at both American and New Zealand frequencies, can handle the 1200 baud V.23 speeds used for videotext operation, provides internal digital filtering, and can leap over tall specifications with a single bound.

Modem building not a simple afternoon job

Are you beginning to get the idea that building a modem is not a simple afternoon job? Keep reading! To get the signal into the detector or "demodulator" you need to amplify the faint signals picked up from your telephone, but must reject the very similar and much louder tones being generated from your own transmissions. Mechanical coupling and intentional feedback from your telephone mouthpiece to the earpiece conspire to sneak your own frequencies back at you. Filters will be needed with a very sharp separation between the desired and undesired frequencies. They must also respond rapidly to changes, without ringing, and with equal phase delay (i.e., all frequencies of interest must be delayed by the same amount). You must build these filters with top quality, 1 per cent precision resistors, and the best capacitors

you can find. You will will need to fine-tune these filters, which calls for a well calibrated frequency generator plus a good oscilloscope.

Finally, we come to the connection between your modem and the telephone network. Undoubtedly the best way is through a "direct-connect" modem, which plugs into the telephone jack.

Only modems that have been type-approved by the New Zealand Post Office can be used. A major breakthrough in Post Office policy seems imminent, with approval of privately sold direct-connect modems being rumoured. At the moment the only legal direct-connect modems are those hired out by the Post Office.

Most readers will settle for acoustically coupled modems, in which the telephone handset fits into a carefully cushioned unit with a speaker and a microphone replacing the human mouth and ear, respectively. These units are reasonably effective, particularly if your phone is not too far from the switchboard, and if your home is reasonably quiet. (Children practising musical instruments are almost certain to cause interference.) Some carbon microphone insets need to be tapped to restore sensitivity; the latest telephones have much better sensitive dynamic microphones.

There are no legal restrictions on using an acoustically coupled modem so long as you keep to the official CCITT frequencies and limit your transmission power below 1 milliwatt. In any case, excessive transmit power would make filtering out your own signal more difficult. In addition, high power levels can cause signal spillover to adjacent channels.

You will have gathered that I don't really recommend modem construction to the average reader. Most of the published designs are for American frequencies and not easy to change. If you feel competent and have more time than money, you might try the version worked by a South African micro club, as detailed in *Byte*, September 1983, pages 484-487. There have been some simple one-channel designs published in Australian and English magazines. I have heard that these are not very stable, and may need frequent readjustment of trimmer pots.

Wireless World, July 1983, pages 33-35, presented a complete design for a direct-coupled modem using the XR chip set and a swept-up Reticon R5631 monolithic switched-capacitor band-pass filter. If you want the option of using either 300 baud or 1200 baud rates, the choice is between the rather complex design from *ETI*, October 1982, pages 18-27, or designing your own with the AM7910 (the local agent is G.T.S. Engineering, Ltd., P.O. Box 9613, Newmarket, Auckland).

For less adventurous souls, the Auckland Micro Users' Group has been making a very good acoustically coupled modem with a cost of $150 for an assembled board. By the time you add a power transformer, cabinet, sockets, etc., the total would be around $200. You should have some knowledge of electronics or at least a knowledgeable friend, before tackling the job.

Ready-made modems have been selling in the region of $700 or $800. This is not excessive considering the kind of attention to design and construction needed for a reliable commercial device. For hobbyist use, however, lower costs are needed. The increased market penetration possible from lower prices might lead to some economies of scale. The Bell 103 frequencies used in the United States are significantly harder to work with than the CCITT frequencies, yet the low cost of modems there shows the effects of competition.

The booming New Zealand sales of home computers together with the rumoured liberalisation of Post Office attitudes might stimulate comparable cost reductions here.

Business move

Mr O.O. Walker, who recently retired as managing director of the country's second biggest company, N.Z. Forest Products Ltd, has moved into the computer world. He has become a director of the Auckland based company, Telephone Marketing International Ltd. Mr Walker predicts that telephone marketing in conjunction with computer technology will reduce expense and time spent on travel by executives and sales staff.

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DEC Rainbow

Many extras and a price that's competitive

By Warren Marett

When Digital Equipment Corporation released its Rainbow 100 microcomputer just over a year ago it was thought that the attractive machine could capture a large share of the business microcomputer market.

Unfortunately, DEC did not find a pot of gold at the end of the Rainbow. The success of the IBM Personal Computer has eclipsed all other computers in this class.

Nevertheless, the Rainbow has a role to play in the market. It is worth while to review the machine, with an emphasis on its special features and the advantages of observing it a year into its life.

The principal special feature of the Rainbow is its dual-processor design. A Zilog Z80A 8-bit processor is coupled with an Intel 8088 16-bit processor, giving the computer the ability to run both 8-bit software and 16-bit software.

The Rainbow's CP/M-86/80 operating system automatically selects the correct processor when it loads either an 8-bit program or a 16-bit program into memory.

System functions are also divided by the two microprocessors, using a parallel-processing technique. Reading or writing to the floppy disks is controlled by the Z80A, while the video display, keyboard, serial printer port, communications port, and options are controlled by the 8088.

What exactly is this operating system called CP/M-86/80?

In the beginning, there was CP/M, an operating system for various 8-bit microprocessors. Then its owners, Digital Research, built CP/M-86, which is little more than a 16-bit version of CP/M.

But the many thousands of programs that run on an 8-bit microprocessor under CP/M will not run on a 16-bit microprocessor under CP/M-86 unless they are rewritten or converted for the different microprocessor and different operating system environment.

The DEC Rainbow

Many of the most popular programs, such as WordStar and Multiplan, are now available under CP/M-86, but there are other programs still only available in 8-bit form. In addition, many organisations have a substantial investment in 8-bit software and do not want to go out and buy 16-bit versions of the same programs when they install a 16-bit microcomputer.

DEC has combined CP/M and CP/M-86 into an operating system which it calls CP/M-86/80. With its dual-processor architecture and CP/M-86/80 the Rainbow can happily digest both programs that run under CP/M and programs that run under CP/M-86.

As time goes on, and the amount of 16-bit software available increases, the benefits of DEC's approach become less important. But today many organisations may find the flexibility useful. (Of course, not all CP/M and CP/M-86 software can run on the Rainbow. Just as it is not possible to freely interchange CP/M programs between different CP/M machines, because of hardware differences and disk format differences, so it is not always possible to migrate a CP/M program or CP/M-86 program to the Rainbow.)

MS-DOS proving more popular

DEC has also released the 16-bit MS-DOS operating system for the Rainbow, which is turning out to be a more popular operating system than CP/M-86.

Locally, DEC has been able to catalogue more than 150 packages or programs that will run under CP/M-86/80 or MS-DOS. Many others will also run.

A number of the catalogued packages and programs are supported directly by DEC, with a 12-month warranty if purchased with a Rainbow (which also has a 12-month warranty).

They include the IMS general accounting packages, the Charter Series from Interactive Applications, Ltd, the MicroPro programs (including WordStar), the SELECT word processing program, the Multiplan spreadsheet package, TK! Solver, MBASIC, CBASIC, and a number of other languages.

In terms of hardware design the Rainbow has been highly praised. A standard Rainbow consists of three

components: a system unit, a monitor, and a keyboard.

The system unit contains the main electronics, the power supply and a pair of 5¼-inch floppy disk drives. There is room for another pair of disk drives in the system unit, or alternatively a five or 10-megabyte hard disk.

It is not even necessary to own a screwdriver to get access to the internals of the system unit, or remove a component for repair. Installing a system option or removing a component is as simple as turning a few screws.

Three option slots are available on top of the motherboard for the addition of optional modules such as increased memory or the graphics option. (Most purchasers will want to start with 128K bytes of memory.)

An optional floor stand is recommended to mount the system unit vertically alongside your desk, rather than taking up valuable desk space.

Another advantage of using the floor stand is to get away from the noise of the fan in the system unit and the surprisingly-noisy disk drives.

The 5¼-inch diskettes hold 400K bytes each, but still only are single-sided. It is natural to try to pull the disk drive doors open, until one realises that it is a lot easier to just press on another part of the door for entry.

Diskettes go a different way into the A drive than the B drive, which is slightly awkward. However, DEC diskettes are clearly marked to show the right orientation. Sometimes, on removing a diskette, the write-protect notch catches on the side of the drive.

A standard Rainbow can be ordered with either a white, green or amber display. The monochrome video monitor is a compact unit with excellent character definition, and an almost total absence of glare. It is a wedge-shaped unit that fits well on a corner of your desk.

105 keys on well designed board

The Rainbow's keyboard is also a well-designed unit. The keys feel wishy-washy at first, but within a few minutes you realise that they encourage fast and effortless typing. There is a special set of editing keys (including the cursor control keys) between the traditional keyboard and the numeric keypad. These keys are used by the CP/M-86/80 screen editor (RED) and the SELECT word processing package. Above these keys is a HELP key and a DO key, used by some tailored software. Across the top of the keyboard are 18 other function keys and there are four function keys above the numeric pad.

With 105 keys, DEC could not be accused of skimping on the keyboard's design. If an application program used all the keys you would get a tired arm moving across the large keyboard!

The Rainbow hardware has some "soft" features that are alterable through a "Set-Up" key. Typical features that can be changed are the screen width (80 characters or 132 characters), tab stops, printer settings, communications options (particularly so that the Rainbow can act as a terminal to another computer system), and keyboard characteristics.

In the hardware design, major software products, and documentation, DEC has tried hard to make the system understandable to the neophyte computer user.

A computer-based instruction diskette comes with the Rainbow to provide a gentle introduction to the computer and its software. The course covers the basics of the Rainbow, getting started with CP/M-86/80, an introduction to files and information about the commands and utilities in CP/M-86/80.

CP/M-86/80 itself has a help feature (which, strangely, does not use the HELP key).

The Rainbow manuals are oriented much more to the unsophisticated user than the knowledgeable user. Unlike DEC's traditional manuals, they do not provide the background information that an expert user might find helpful.

For their intended audience the manuals are good. They are the modern, smaller size, spiral bound and boxed in heavy cardboard files. Perhaps they would have been better in ring binders so that they can be updated easily.

Each manual set for a software product starts with an easy-to-follow "getting started" manual. There is a notable absence of reference cards (although most software has on-line help which largely supersedes such reference cards).

The preferred word processing package for the Rainbow is SELECT-86, from SELECT Information Systems, Inc. It is well integrated with the machine and is one of the better microcomputer word processing packages.

Well integrated word processor

A one-line menu at the top of the screen reminds you of SELECT commands, and a comprehensive computer-based instruction course is provided with the package. Included with SELECT is a spelling checker, callable from the main SELECT menu and easy to use. SELECT can also pick up spreadsheets created with Multiplan and incorporate them into a document.

HARDWARE REVIEW

A good reason for using SELECT on the Rainbow, rather than some other word processing package, is that the CP/M-86/80 screen editor, called RED, is a subset of SELECT.

Multiplan is the preferred spreadsheet package for the Rainbow. It also uses some of the keyboard's special keys, but Multiplan is so well presented that it hardly needs this assistance.

Feedback from users of the Rainbow indicates that DEC has established an excellent support service for the computer.

For any problem, hardware or software, the owner rings (collect) an Auckland hot-line, which attempts to sort out the problem over the phone. Hardware maintenance is provided by the local DEC office and can include on-site visits.

The hardware and major items of software have an unusually long warranty period of 12 months.

The standard Rainbow has recently been joined by the Rainbow 100+ which has 128K bytes of memory and a 10-megabyte disk drive included. It sells for $12,882.

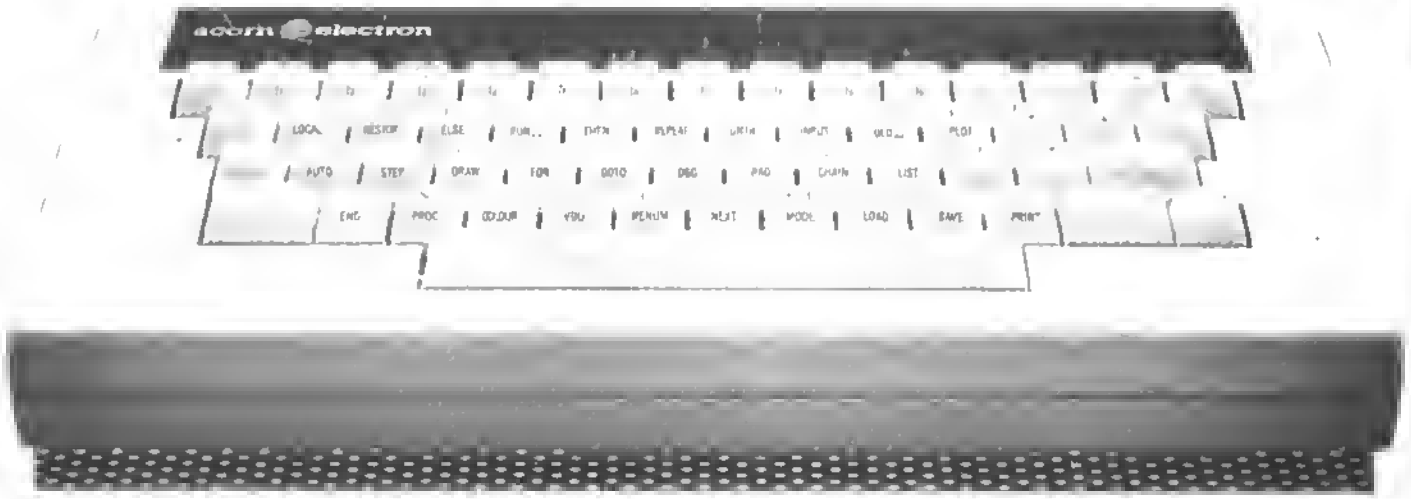
These personal computers are also members of a family of DEC microcomputers, which includes a special word-processing system and a microcomputer with the PDP-11 instruction set built in.

Locally, DEC has sold nearly 400 Rainbows since the product's release in the middle of last year. Considering the competition this indicates a good penetration and shows that many buyers appreciate the extra features and competitive price of the Rainbow.

Microcomputer summary

Name:	Rainbow 100.
Manufacturer:	Digital Equipment Corporation.
Microprocessors:	Z80A and 8088.
Clock speed:	4 MHz (Z80A) and 4.8 MHz (8088).
RAM:	64K bytes, with additional 64K-byte or 192K-byte optional boards.
ROM:	24K bytes, containing system boot, diagnostics and terminal emulation routines.
Input/output:	White, green amber or colour monitor. Dual 5¼-inch floppy disk drives, each 400K bytes. Serial RS232/423 printer port. Asynchronous/Synchronous RS232/423 communications port.
Keyboard:	105 keys, including separate editing keys, numeric keypad and 24 special function keys.
Display:	24 lines by 80 or 132 characters.
Languages:	M8ASIC-86, CBASIC-86, MWC-86 (C Compiler), Pascal/MT+86 and others.
Graphics:	Optional graphics module with GSX-86 software, 800 X 240 or 384 X 240 resolution.
Sound:	Bell.
Cost:	Basic system with monitor, dual floppy disk drives and no software, $6897 (including 40 per cent sales tax).
Options:	Colour monitor, add $1115 to system price. Two additional floppy disk drives, $2242. 64K-byte memory addition, $681. 192K-byte memory addition, $1140. Five-megabyte hard disk, $3177. Ten-megabyte hard disk, $6365. Extended communications option, $1127. Graphics option, $1039.
Software:	CP/M-86/80, $155. MS-DOS, $360. Multiplan-86, $478. SELECT-86 word processor, $692. Numerous other packages.
Peripherals:	LA50 personal printer, $1564. LA100 draft and near letter-quality printer, $3475. LQP02 letter-quality printer, $4777.
Reviewer's ratings:	Documentation, 4; Ease of use, 4; Value for money, 4; Support, 5; Expansion, 4.

Review machine supplied by Digital Equipment Corporation, Christchurch.



The Acorn Electron keyboard

The Electron

Cut-down BBC for about $800

By Pip Forer

With some 18 issues under its belt *Bits & Bytes* has reviewed in detail well over 30 microcomputers and commented on a legion more. The New Zeatand mini-market has attempted to embrace almost every microcomputer under the sun, from the tBM-PC to the Albanian Zog Electronic Abacus, and *Bits & Bytes* has faithfully chronicled the progress. Of all of these machines it is clear that perhaps 10 or 12 will survive in significant numbers: 19B4 will be a chill year for many of the others. What price then yet another B-bit machine at the low-cost end of the market? Surprisingly for the Acorn Electron, the starting odds, at least, are very favourable.

I was asked to look at the Electron because of my dabbling with the BBC microcomputer. Although that may mean I have a natural leaning towards what the Electron offers it is also appropriate since it is hard to evaluate the Electron without being constantly aware of its very close similarities with the BBC machine. The Electron is essentially a very good piece of hardware. What gives it that added attraction, however, is its links to the considerable BBC user community in education and the home market. It is on considerations like these and the quality of the software or the operating system, rather than the hardware itself, that all machines now stand or fall.

The Electron's hardware, however, first needs description. It comes as a small, compact keyboard unit with a power supply external to the unit. Without parroting the brochures and advertising hand-outs too much these are its salient points.

Essentially the Electron is a stripped-down BBC computer aimed to price in better with the home consumer market. It has a 6502 processor running at 2 megaHertz and 64K RAM. Of this, however, 16K goes in its operating system and 16K for its outstanding structured BASIC, which is good enough to put any other commonly available BASIC (and certainly the Microsoft versions) to shame.

This memory allocation, which leaves the user with 32K free RAM, is a limitation to program size, but a boon in the quality of the system it offers. The operating system and BASIC are the standard BBC issue. Apart from a slower processing speed (about 35 per cent down) and the absence of a Teletext chip to give

screens of teletext coloured text, most BBC software runs on the Acorn. Certainly, the BBC's outstanding colour graphics and graphics commands are preserved completely intact. The sound has lost channels, however.

At under half the price of a BBC what features have been sacrificed? The main difference between the BBC and Electron is the loss of the various input and output ports with which the BBC bristles. The Electron has a cassette port and three video options (TV, straight video, and RGB monitor) but no more. The user will be able to expand up to include all the various features the full BBC can manage through an expansion box, the slot and anchoring screws for which are provided at the back of the machine. For a home unit this makes sense in some areas (the 1 megaHertz BUS for instance) but the absence of a built-in printer port is a regrettable omission. The details of the expansion box (or boxes) have not been released, but already the British market has produced a variety of non-Acorn expansion options such as a joystick port. It would seem that the Electron could handle any of the expansions of the BBC, including a 32-bit second processor and sideways ROMs, with the correct expansion options.

The Electron has gained a few points, too. For the home it is small and (at long last from a British machine) elegant to look at. Certainly more so than the utilitarian BBC and arguably more than any other 8-bit micro. Its keyboard is a reduced version of the BBC with several keys apparently missing. However, in fact, the same range of functions and more are provided through a dual purpose capitals lock/function key. When held down this allows the 10 numeric keys to behave as programmable special function keys. It also gives a third 'value' to all the other keys on the keyboard.

In some cases this is used to allow three characters to be accessed from one key (cursor move, pound, and scroll bracket for instance). On most of the keys, however, the effect is to produce BASIC verbs at a single stroke, or useful commands such as 'RUN, Carriage Return'. The keywords are clearly but discreetly etched on the side of each key. This would be useful for any micro. It has especial advantages in BBC BASIC where variable names may be any length and in upper or lower case. Programmers often like to make their program easier to interpret by using lower case for variable names. On the BBC this means using the shift key a lot since the BASIC commands must be in capitals. On the Electron you can by-pass this. The keyboard is a full-travel keyboard and very pleasant to use.

The Electron comes with three aids to its use. *The Electron Guide* is in the excellent tradition of the *BBC User Guide* with the irrelevant parts removed and the welcome addition of an improved section on assembler programming. Most of the introductory programming sections have also gone. This is mainly because the second item is a short (140 pages) but useful text on programming in BBC BASIC. Finally there is a welcome tape with 13 programs on it. These include a keyboard familiarisation program, some games and some graphics demonstrations published elsewhere for the BBC.

The only odd thing about the Electron's total packaging is that the British model has no on/off switch: it needs switching at the mains I understand thought is being given to

installing a switch on the power lead for the New Zealand market.

In summary, the Acorn is good 8-bit hardware with the potential for upgrading along the design path of the BBC computer. Its strengths on its own are its outstanding BASIC and high quality graphics. Apart from its one or two noticeable flaws (the printer port and power switch) it offers a good entry system machine. What marks it as a winner is that it has links to an established user community. Overseas this means the British computer market, along with the education system from primary upwards. In New Zealand it relates to the fact that, with the Apple II, the BBC computer is really the de facto standard in New Zealand schools. Software and expertise seem far more likely to be available for this machine than many other cheap offerings, particularly the Japanese and some of the US machines which are having discontinued production overseas.

The Electron is expected to sell at under $800 tax paid. This places it above the bargain basement machines and below the more fully configured and flexible offerings such as the Apple II and 8BC. Its closest price competitor is probably the Commodore 64. In a straight run these two should come pretty close. For some users, though, the BBC relationship may prove the deciding factor.

It may well prove popular with parents who have children at BBC-based schools and for primary schools with links to secondary in mind. (It will need a good LOGO cartridge for the expansion box to meet some of the demands from the latter, however).

It may also have a future as a "cheap keyboard" option for school networks. The expansion options are claimed to include the ability for an ECONET interface. Since for a network station a lot of the extra user ports on the BBC are unnecessary many schools may look to an ECONET with a few fully-configured BBCs (for printers and disks) and a lot more Electrons for most of the keyboard work. If the ECONET expansion is cheap enough schools may be interested in a functioning microcomputer unit at around the $500 mark. All this, however, hangs on forthcoming upgrades. At this point in time it should be judged as a 'stand-alone', cassette-based machine.

In short, the Electron scores on a lot of dimensions apart from its attractive hardware. At the moment any machine reviewer should not just comment on the machine as equipment but as a long-term survivor. A lot of good hardware will go to the wall in 1984: the real question is whether a new machine can secure a market niche. Given prompt and reliable supply the Electron will and it will survive and thrive. It deserves to.

Microcomputer summary

Name:	Acorn Electron.
Processor:	6502 at 2 MHz.
ROM:	32K.
RAM:	32K.
Input/Output:	Cassette Port.
Keyboard:	Full travel QWERTY with 55 keys with 3 shifts (Shift, CNTRL and FUNC).
Display:	Connects to Video, TV, or RGB Monitor.
Language:	BBC structured BASIC.
Graphics:	Five modes: Maximum 16 colours or 640 by 256 pure bit mapped.
Peripherals:	Disks 400K when available. DOS will be BBC DOS when the interface is ready.
Price:	Around $800.

Review unit supplied by Whitcoulls Ltd, Christchurch.

Wizzard blue

The Wizzard column that was printed in the last issue of BITS & BYTES was mistakenly headed VZ200. Our apologies.

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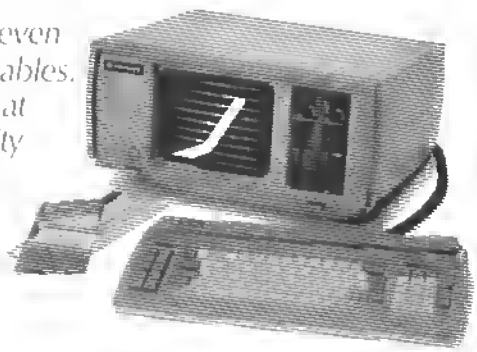

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Games and CP/M for not too much

By Shayne Doyle

The Pencil II

The Pencil II has just been released in New Zealand this month. From Soundic Industries, Hong Kong, the Pencil is placed right in the highly competitive $300–800 band, although it can be expanded to full CP/M capability at quite a reasonable price.

Of eye-catching appearance, the Pencil is an average-size, black plastic enclosure with the keyboard in contrasting grey. Each row of keys is delineated by a blue band. On the bands are printed the pre-encoded statements and functions assigned to each key. As may be expected of a machine in this price bracket, the keyboard is a "chiclet" type, with rubber keys. When a key is pressed an audible indication is given, and this is necessary as a key can be pressed on the edge without its registering.

There is a normal-size space bar and RETURN and SHIFT are double sized as on a normal keyboard. To the right are four cursor keys, and at the top is a row of six programmable function keys. These only hold eight characters, which is not enough to be of much use. In my opinion a useful function key should be capable of referencing at least 40 characters. All keys have auto repeat at a good speed. I do not like these keyboards, but this one was all right for slower typing. The cursor keys are used for the full screen editor, and if shifted, perform insert and delete operations. All the alphabetical keys are both upper and lower case.

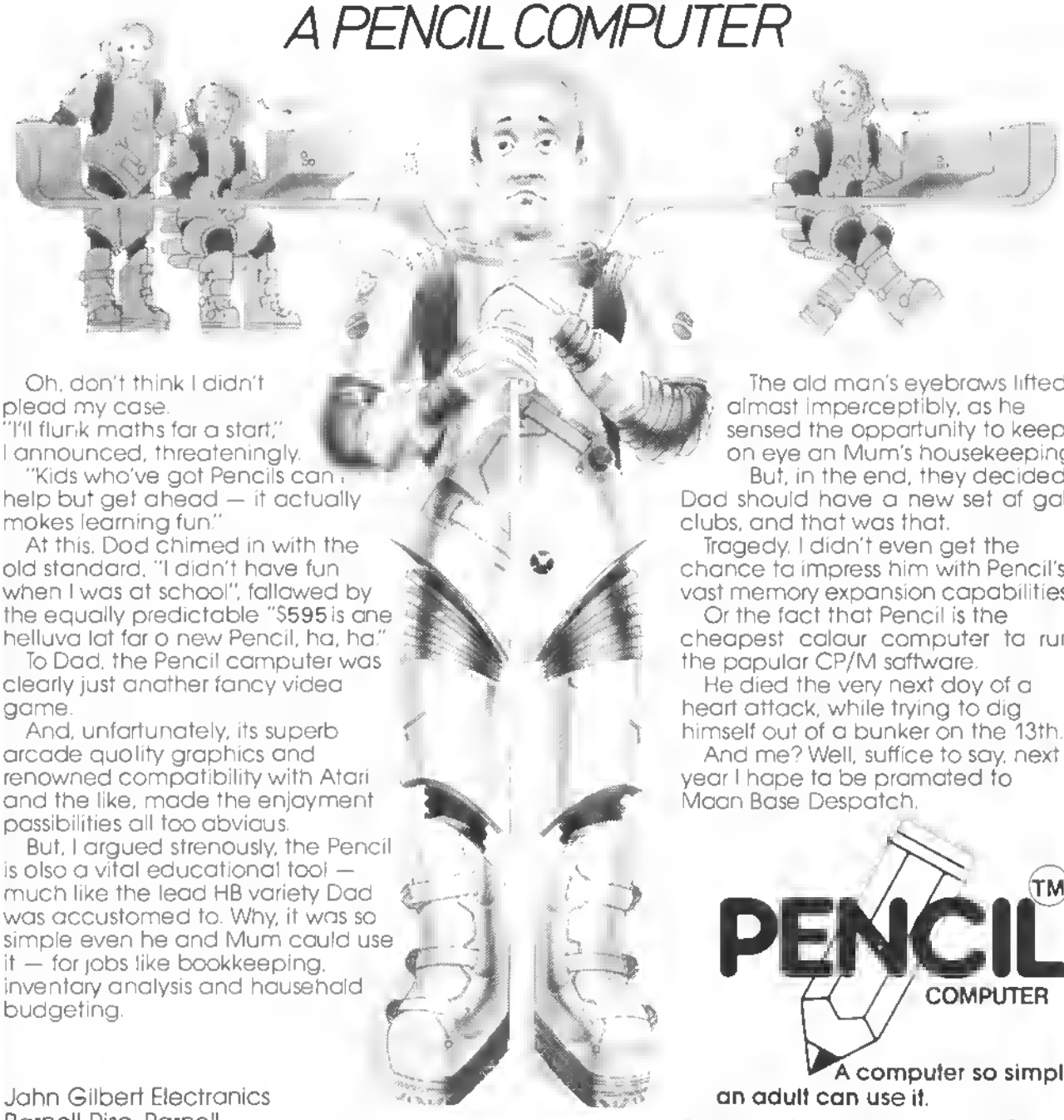
On the rear of Pencil's case are sockets for power supply (plug pack), TV output, composite video output to a monitor, cassette recorder, left and right joysticks, and parallel printer port. On the right end of the machine are two slots, one for the memory expansion modules or games adaptor, the other for system expansion modules — modem, RS232C interface, or disk drive controller module. In the top right surface is a slot for language, games, or applications software cartridges. By inserting the appropriate conversion module in the memory expansion socket, Pencil runs Coleco and Atari video game cartridges. Each of the system expansion modules is designed to stack on the end of the computer and match it in size, shape, and attractive delivery.

Two cartridges lent to me were Zaxxon and Smurf — both featuring superb graphics and really showing off the capabilities of the video controller chip, a TMS 9918. Some of you will indeed be familiar with Zaxxon — a 3D penetrate-and-destroy style arcade game in which the scenario scrolls diagonally from top right to bottom left while the player(s) pilot their ships through the various hazards battling sundry foes, gauging the ship's altitude from the shadow on the ground. The Smurf game illustrates well the sprite facility of this chip.

Unfortunately, the S-BASIC cartridge supplied with the machine is rather "basic", having absolutely no graphics commands at all. To use graphics with this BASIC requires it to be done in machine code — an easy task for an experienced low-level language programmer, but quite out of the question for the average person buying this computer. However, an enhanced version conforming to the new Japanese MSX BASIC standard is to be released in 1984 as an option. This will enable the home user to make full use of the very powerful capabilities of the TMS9918 video chip and SN76489 sound generator chip.

The supplied S-BASIC has most of the standard commands, but there are a few limitations. Strings may only be a maximum of 32 characters; RESTORE does not have a line number variable; the INPUT statement does not allow an associated literal; IF structures are limited to IF . . . THEN and IF . . . GOTO; and there is no provision for

BACK IN '83 MY PARENTS DECIDED WE COULD DO WITHOUT A PENCIL COMPUTER



Oh, don't think I didn't plead my case.
"I'll flunk maths for a start," I announced, threateningly.
"Kids who've got Pencils can't help but get ahead — it actually makes learning fun."
At this, Dad chimed in with the old standard, "I didn't have fun when I was at school", followed by the equally predictable "$595 is one helluva lot for a new Pencil, ha, ha."
To Dad, the Pencil computer was clearly just another fancy video game.
And, unfortunately, its superb arcade quality graphics and renowned compatibility with Atari and the like, made the enjoyment possibilities all too obvious.
But, I argued strenously, the Pencil is also a vital educational tool — much like the lead HB variety Dad was accustomed to. Why, it was so simple even he and Mum could use it — for jobs like bookkeeping, inventory analysis and household budgeting.

The old man's eyebrows lifted, almost imperceptibly, as he sensed the opportunity to keep one eye on Mum's housekeeping.
But, in the end, they decided Dad should have a new set of golf clubs, and that was that.
Tragedy. I didn't even get the chance to impress him with Pencil's vast memory expansion capabilities.
Or the fact that Pencil is the cheapest colour computer to run the popular CP/M software.
He died the very next day of a heart attack, while trying to dig himself out of a bunker on the 13th.
And me? Well, suffice to say, next year I hope to be promoted to Moon Base Despatch.

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Computer Marketing Manager
Fortuna Industries Limited
P.O. Box 25014 Wellington
Or phone 873-155
Wellington.

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Microcomputer summary

Name:	Pencil II.
Manufacturer:	Soundic Electronics Ltd, Hong Kong.
Microprocessor:	Z80A.
RAM:	16K User RAM, expandable to 80K bytes.
ROM:	8K Monitor ROM, 12K BASIC ROM cartridge expandable to 32K ROM.
Input/output:	Video — RF TV output and composite video. Monitor output. Joysticks sockets. Cassette I/O port at 600 bps. Parallel printer port. Program cartridges ROM slot. Memory expansion/game adaptor slot. System/Peripheral Expansion bus slot.
Keyboard:	59 key rubber chiclet type, auto repeat on all keys, upper & lower case.
Display:	TMS 9918 Video display controller. Character display — 24 lines x 32 characters, 24 x 80 with 80 column module. Graphics display — 256 x 192 pixels. 16 background, 16 character/pixel colours.
Languages:	S-BASIC interpreter ROM pack. MSX BASIC ROM cartridge optional.
Sound:	SN76489 sound chip — 3 audio channels + white noise channel. Audio output through TV speaker or video monitor speaker.
Cost:	Including power pack and S-BASIC cartridge $595.
Options:	16K RAM cartridge $115. 64K RAM cartridge $245. Coleco or Atari game adaptor T.B.A. Joysticks with numeric keypad (pair) $59.95. RS232C serial interface module $118. Telephone modem module T.B.A. CP/M 80 column module $145.
Peripherals:	Data cassette recorder (with counter) $80. CP/M SSOD disk drive package $995. CP/M DS00 disk drive package $1195. Parallel printer T.B.A.

Review machine supplied by Fortuna Industries, Ltd, Wellington.

print formatting.

Variables may be fixed or floating point, named by the usual first two characters convention. There is a COLOR command; a SOUND command for control of the sound generator; PRINT# and INPUT# to write/read cassette data files; a full quota of string and numeric functions; and all the usual relational and logical operators such as NOT AND OR. There is some syntax checking on input, with a series of two character error codes associated with each error message.

As I mentioned earlier, there is an 80-column module, and a choice of two disk-drive packages — single-sided, double-density or double-sided, double-density. As these were not available at the time of writing this article, I cannot comment on their performance. However, at $995 the disk drive package is quite well priced, as it includes the half-height drive, drive controller, power unit, cable, and CP/M disk.

I was most impressed with the colour quality on my TV. It had a very sharp picture with virtually no colour wash. The sound was excellent as well — no overlying hum or noise at all.

One thing to watch is the RESET key. It is easy to press accidentally, being on top next to the function keys.

A very good feature is the provision of a parallel printer port. Many low-cost computers these days still require a reasonable expensive add-on to use a printer. The port also permits experimenting with other input/output devices.

Fortuna has sourced a very attractively priced printer, and details will accompany the official launch of the computer.

It is the policy of Fortuna Industries to back this computer completely with both hardware and software support, and it would also like to encourage the formation of user groups.

In summary, I feel the Pencil II has a good future in the New Zealand market; with the more powerful MSX BASIC. The good line-up of accessories and peripherals, together with enthusiastic dealer support, means it should be able to capture a market share.

New Wellington contact

The micro news contact in Wellington is now Pat Churchill, telephone 797-193.

PC Jun. still months away — at least

Those who went to the IBM product seminar in Wellington recently expecting to see the PC Junior were disappointed. The previous year, the corporation launched its PC, but there was nothing so dramatic this year.

Instead, the rows of reporters in the IBM seminar room heard the New Zealand chairman, Mr Basil Logan, describe how the firm had had a much better year in 1983 after dipping in 1982 because of exchange losses.

IBM has 530 employees in New Zealand, and is clearly tooling up to seek a larger slice of the market. For example, in 1983 it hired 15 new graduates to join its marketing staff compared with 10 in each of the previous two years. It has also bought 3.1 hectares at Petone for a warehouse and distribution centre, and for training.

The conference was told that the IBM dealer network was successfully selling PCs and software, some of which is not handled by IBM product centres.

The dealers can expect to have stocks of the PC Junior in the second half of this year at best, and it could be as late as 1985.

IBM has made considerable sales of the PC to universities with an educational discount last year, and this marketing will be continued. The PC also has a toehold in at least two of the country's secondary schools, and the corporation will be trying hard to further its links.

The firm sees education as an important market for the PC, and by the end of the year it will have two staff members involved in marketing to the educational sector. Any software development will probably be in association with the Education Department.

The IBM PC has been chiefly selling to business users, who have in many cases preferred to buy the PC's big brother, the XT, sales staff explained to the reporters who were shown through the Wellington headquarters in relays.

The conference was a far cry from less than a decade ago, when the news media expressed so little interest in IBM that the firm even went to the extent of holding news conferences in different centres to arouse interest.

The BITS & BYTES Computer Book Club

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Use your bonus points and save money on these Spectrum specials.

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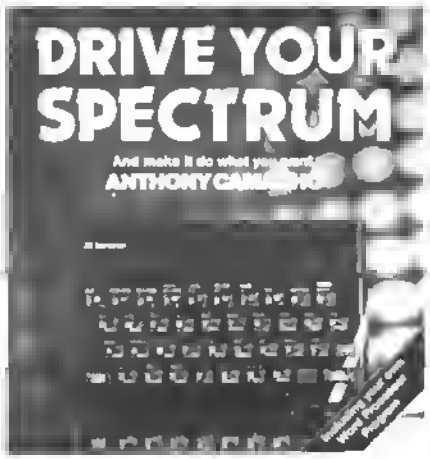

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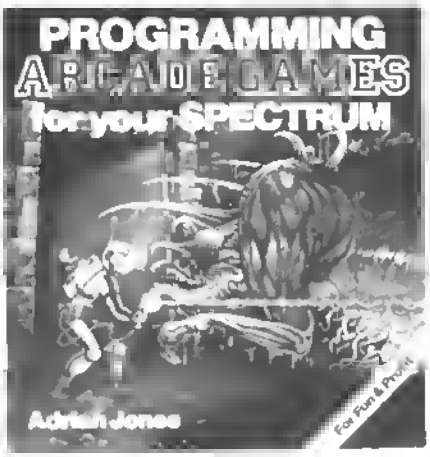
Anthony Camacho

Our price $15.70.



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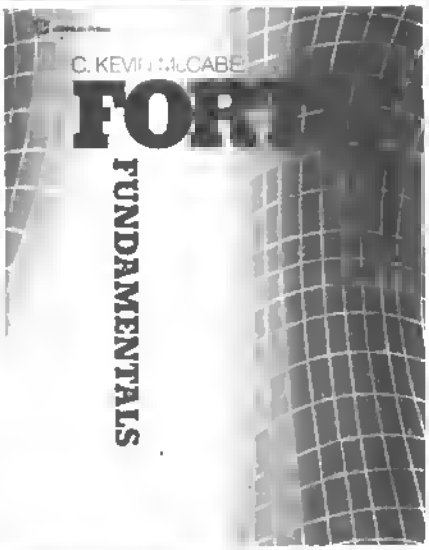

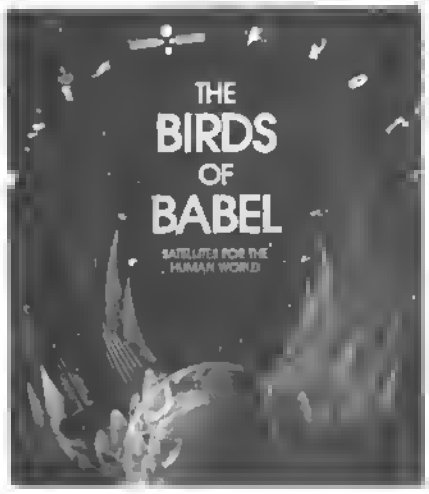

VIC

The Commodore 64/VIC-20 8ASIC Handbook — Douglas Hergert

[illegible]

Our price $20.85. Save $1.10 and earn 2 bonus points.

The VIC-20 Connection — James W. Coffron

[illegible]

Our price $17.05. Save 90 cents and earn 1 bonus point.

VIC Revealed — Nick Hampshire

A comprehensive [illegible] the VIC [illegible] hardware [illegible] uncovering features [illegible] programming power given the limited memory [illegible] and graphics [illegible] the video interface chip and I/O capabilities. Detailed VIC memory map, explanations of BASIC ROM variables, user memory and data storage. Complete instruction set for 6502 CPU [illegible] along with options for [illegible] subroutines [illegible] VIC BASIC programs. Sound effects programming and graphics programming described and an outline [illegible] on how to extend the VIC's home applications.

Hayden — Our price $26.55. Save $1.40 and earn 2 bonus points.

VIC Graphics — Nick Hampshire

Explains the [illegible] and the VIC [illegible] colour code, with [illegible] from art and games to educational simulations [illegible] and business. All program listings tested and [illegible]. Program [illegible] plotting, drawing maps, rainbow [illegible] games, bar charts and line graphs [illegible] character and shape design and moving shapes on the screen [illegible] use of VIC Super expander cartridge [illegible]

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VIC Games — Nick Hampshire

Collection of [illegible] programs [illegible] arcade style, strategy and educational word games. [illegible] fighting space pirates [illegible] maze [illegible] solving Rubik [illegible] images and accompanying music, finding your way out of a jungle, improving spelling and vocabulary [illegible]

Hayden — Our price $26.55. Save $1.40 and earn 2 bonus points.

Vic 20 User Guide — John Heilborn & Ran Talbott

Designed to help you enjoy your computer time whether for entertainment or practical applications. Shows how to operate the VIC 20 and all its peripherals, program in VIC BASIC, use the machine's full range of colour graphics and sound capabilities, build a custom character set, and learn advanced mathematical programming

Osborne McGraw Hill — Our price $29.80. Save $1.60 and earn 2 bonus points.

Putting Your VIC 20 to Work — Tom Lau

[illegible]

Our price $16.10. Save 85 cents and earn 1 bonus point.

Fifty Outstanding Programs for the VIC 20 — Tim Hartnell

[illegible]

Our price $22.75. Save $1.20 and earn 2 bonus points.

Zap, Pow, Boom: 30 Games for your VIC 20 — Mark Ramshaw

[illegible]

Our price $26.35. Save $1.40 and earn 2 bonus points.

VIC 20 Starter Book — Jonathan A. Titus, Christopher A. Titus & David G. Larsen

An introduction to programming and understanding the VIC 20 written especially for the first-time user who wants to learn quickly. Avoids highly technical details and terminology and includes diagrams, photographs, programming experiments and questions and programming problems with answers provided.

Sams — Our price $31.90. Save $1.60 and earn 3 bonus points.

VIC 20 Programmer's Notebook — Earl R. Savage

Collection of programming techniques, hints and kinks [illegible] subroutines and shortcuts. Equally useful for beginners and experienced VIC users.

Sams — Our price $29.85. Save $1.55 and earn 3 bonus points.

VIC 20: 50 Easy-to-run Computer Games — Edward Burns

[illegible]

Sams — Our price $11.90. Save 60 cents and earn 1 bonus point.

VIC 20: Games, Graphics and Applications — David C. Busch

[illegible]

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Keyboarding

Quick Keyboarding — Vonnie Alexander

Sub-titled "Competent Keyboarding in 6 Hours", this book by New Zealand Vonnie Alexander has a unique method for teach-yourself competent keyboarding. A wall chart of finger positions is included.

Methuen — Our price $6.50. Save 45c. and earn 1 bonus point.

Keyboarding for Information Processing — Robert Hanson

Enables a person to develop basic touch keyboarding skill in a minimum time. The person who completes the book will be able to key in alphabetic, numeric and symbol information, input numbers on a seperate 10 key pad, keyboard information quickly and accurately, understand some of the basic vocabulary used in keyboarding. Can be used for classroom or individual, self-instruction.

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General

The Joy of Computers — Peter Laurie

[illegible]

Our price $33.20. Save $1.75 and earn 3 bonus points.

Illustrating Computers (Without Much Jargon) — Colin Day & Donald Alcock

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Pan — Our price $6.60. Save 35 cents and earn 1 bonus point.

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Hutchinson — Our price $14.20. Save 75 cents and earn 1 bonus point.

The Good Computing Book for Beginners — Dennis Jarrett

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Hutchinson — Our price $7.55. Save 40 cents and earn 1 bonus point.

Microcomputer Colour Graphics Systems — Donald Bell

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Our price $23.50. Save $1.25 and earn 1 bonus point.

Introduction to Data Processing — John Moss

Introduction to fundamental terminology and [illegible] topics such as functional [illegible] of computer [illegible] basic principles of file processing, representation of data in information systems, standards of validation and presentation of data, documentation of program [illegible]

Hutchinson — Our price $18.55. Save 95 cents and earn 1 bonus point.

Buy now!

Commodore

Basic Subroutines for Commodore Computers — Eddie Adams

Easy-to-use manual which offers access to more than 300 BASIC subroutines — powerful building blocks you can combine and adapt to create programs for a wide range of business, educational and personal applications. Explanations for each subroutine with suggestions for modifying it to your needs. Each program is ready to run on any Commodore system.

Wiley & Sons — Our price $30.35. Save $1.60 and earn 3 bonus points.

How to Use The Commodore 64 — Jerry & Deborah Willis

[illegible]

Our price $8.55. Save 40 cents and earn 1 bonus point.

More Than 32 8ASIC Programs for the Commodore 64 Computer — Tom Rugg & Phil Feldman

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Our price $45.55 Save $2.40 and earn 4 bonus points.

BBC

100 Programs for the 88C Microcomputer (Models A & B) — John Gordon

Published in association with Acornsoft, this book sets out to answer the question what do you use a microcomputer for? Routines cover home, business, school and recreational uses. Programs are clearly presented and the author provides a brief explanation with each.

Prentice Hall — Our price $25.55. Save $1.35 and earn 2 bonus points.
Cassette available: Our price $47.45. Save $2.50 and earn 4 bonus points.

Structured Programming With 88C 8ASIC — Roy Atherton

[illegible]

Our price $31.30. Save $1.65 and earn 3 bonus points

Basic Programming on the 88C — Neil and Pat Cryer

You've seen the machine on television, and this is the book prepared to go with programme. It's designed for the new BBC. Teaches how to write programs, draw and animate pictures and graphics in full colour, design sound effects and program games. Detailed glossary.

Prentice Hall — Our price $19.25. Save $1.05 and earn 2 bonus points.

Assembly Language Programming for the 88C Microcomputer — Ian Birnbaum

A guide on how to get the most from your BBC. Covers addition and subtraction, decision making and loop structure in assembly language, indexed addressing, multiplication and division, the stack, subroutines and interrupts. Offers some utility programs and provides answers to exercises.

MacMillan — Our price $33.20. Save $1.75 and earn 3 bonus points.

IBM

The I8M PC-DOS Handbook — Richard Allen King

A complete guide [illegible] with your computer [illegible] features and functions of PC DOS, what you can do with them and how they go together. Second half of book shows how to become adept at using PC DOS [illegible] more advanced features.

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Useful 8ASIC Programs for the I8M PC — Stanley R. Trost

A selection of tested programs for more than 60 home and business tasks. Home finances, business calculations, real estate, data analysis, record keeping and education are some of the fields covered. No knowledge of BASIC programming needed to use these programs.

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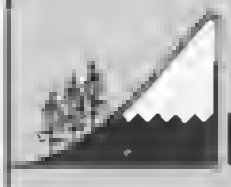

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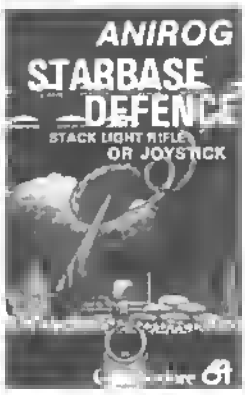

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MOON BUGGY
Experience all the thrills of the arcade game as your patrol craft manoeuvers over the giant pot holes

3D TIME TREK
A 3D Star Trek game with real arcade action. Battle with the aliens.

DUNGEONS
Enter the realms of fantasy with superb use of Sprite graphics. Battle with the fearful fire-breathing Red Dragon

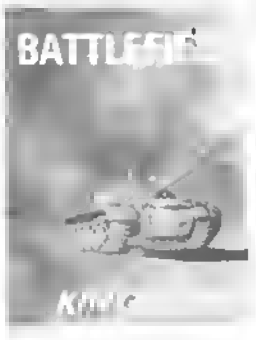
FROG RUN
A popular arcade game brought to life with brilliant animated garphics

GALAXY
Pure actionas your fighter is under attack by fighters and its mothership. 2 player option and 100 screens including challenge stage.

STARBASE DEFENCE
The martial race of Teno have developed dangerous new weapons — can you defend our colonies with the new high power lasters?

COSMIC COMMANDO
Your own shooting gallery. Targest hover and weave just out of range. Fast reactions required in this one.

INDIAN ATTACK
The homestead is under attack by hostile redskins. Once these characters are in the cabin, scalps will be lifted



VIC-20

VIC-20 16K EXP

KRAZY KONG
Popular arcade game brought to life in this presentation with four screens, multi-colour graphics, plus hi score table. A game to enthral the whole family

GALACTIC ABDUCTORS
Experience the terrifying, relentless sound of the approach of the Cybernetic space hawks. While you try to protect yourself from the awesome contents of their pods, they feed greedily on the helpless humanoids. All machine code programme that fills the whole of the screen with stunning graphics while it tests your skills to the ultimate

3D TIME TREK
A brilliant Star Trek game with a difference. Spectacular 3D graphics, real arcade action plus strategy against marauding space pirates.

STAR DEFENCE
Alien commandos and their robots are attacking in force. Defend Earth. Full Defender-type action with Mutants, Landers and Smart Bombs

FIRE GALAXY
Mission Impossible should be the name of this game. 8 different stages of pure action

XENO II
This all machine code game is for true arcadians with super-fast reactions and nerves of steel under pressure. The fourth screen will test you to the limit as the power source guardians bombard you while your shots are blocked by whirling suicide spare ships.

SKRAMBLE
An all machine code game with six sectors and similar to the 64 version

VIC-20 UNEXPANDED GAMES

MINI KONG
Mini version of VIC's famous Krazy Kong. Rolling barrels, lift, handbags, running score, hi-score plus expanded screen and brilliant multi-colour graphics

BATTLEFIELD
The enemy has assembled in strength and is attacking. Destroy them and set up barriers by flying your glider across the battlefield. 10 levels and 10 screens.

SLAP DAB
A fast-moving comical game involving skill and strategy. Sam, the painter man, is chased by woodworms he uncovers while painting a large area. He must paint with skill to isolate them and make trips to fill the paint pot.

ALL $24.95

Anirog Software

DRACULA/LOST IN THE DARK
Twn superb graphic adventures.

FROG RUN
All machine code game inviting you to guide your frngs aeross a very busy highway, a grassy bank pnpulated hy snakes and then a stream full ol turtles, logs and lerneious erocodiles.

DOTMAN
Ghosts chase you as you try to eat the dots. Based on the famous arcade game but with a big dillerence — the ghosts have been given intelligence and will try to corner you.

SPACE PEDE
A multi screen and multi skill level game with fast and furious aetion.

CAVERN FIGHTER
Pilot your ship through the tnrtunus tunnels and eaverns destroying enemy missiles, fuel dumps and airborne fire saucers. 10 skill levels.

CRAWLER
All machine ende version nl Centipede with homing spiders and mushroom-laying fleas. A last and furious game with 10 skill levels.

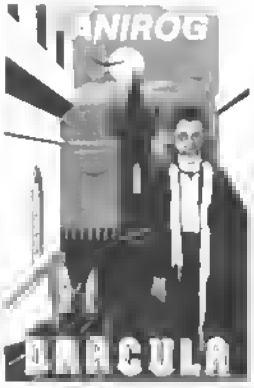
TINY TOTS SEVEN
Super games paek for young children with games like Santa, Simon, Os and Xs, Super Snap, Bomber, etc.

ADVENTURE GAMES

DARK DUNGEONS 16K
Second in the series of lour. Delinitely **NOT** for the faint hearted.

ZOK'S KINGDOM 16K
In thr year 2973, ynur stareruiser, badly damaged in a meteor storm, is foreed to erash land on the planet, ruled by ZOK, a time-space gene rated image ol Count Draeula. ZOK is evil, cunning and eruel. Your ehaneesnl rescue are nil as all the galaetie patrols give this planet a wide berth. You are hungry, frightened and know that ZOK is watching and setting traps.

PHARAOH'S TOMB 16K
The Pharaoh's tomh was deseerated hy the tomh robbers and now abounds with evil. Only hy entering the ehamber with Triangle ol God can you remove this evil. The key to the ehamber was smashed tn pieces, whieh you must lind. Beware the traps set by the ancient Egyptians to punish all those who enter the sacred tomb.



SPECTRUM 16K, 48K

MISSILE DEFENCE
Brings the well-known arcade game to life. Delend your cities frnm the missile attaek and smart bombs 10 skill levels.

SLAP DAB
Giant inseets hiding under the old paint surface are released by your paint brush. Fast aetion and quiek thinking to outwit them and finish the panel.

GALACTIC ABDUCTORS
Giant Space Hawks whirl and wave in intricate patterns as they drop deadly hnming mines. While you are busy delending yourself, the Hawks will leed nn ynur helpless population, returning only their skulls. All machine eode game enmplete with high seore table that will blow your mind with its graphics and sound elfeets.

FROGRUN
Pnpular arcade game. Features inelude snakes, erocodiles, lady lrogs, turtles, ears, trueks & logs.

TINY TOT'S SEVEN
Super games pack lnr younger children, with hright colour and sound. Everybody's lavourite Simon plus Super Snap, Os and Xs, Word Jumble, Bomber, Duck Shoot & Mad Drivers.

ALL $24.95

QUICKSILVA

COMMODORE 64

QUINTIC WARRIOR — Stand alone against Sinster Crabmen and Mangrled Mutants.
RING OF POWER — Search through the kingdom for the mystical ring. Graphics Text Adventure.
AQUAPLANE — Ski through Marine Mantas but beware the deadly snapping sharks
Joystick or Keyboard
PURPLE TURTLES — Turtle bubbing with the cute Purpilins Turtlherrm
BOOGA-BOO (THE FLEA) — Now available for the Commodore 64. Incredible action.
STING — Hire-cade action! Bertie Bee needs help defending the hive. Fight off the invading swarms. Battle the bees and defend your Queen!

BBC B32K

BEEB-ART — High Quality Art Design programme for versatile manipulation of the BBC's graphics ability
THE GENERATORS — Superb Character + Teletext Utility

VIC-20

SKYHAWK — Features multi-colour, hi-res 3D effect graphics. Scrolling landscape, aircraft landing and refueling, radar and aircraft status displays, high score save, full sound effects, varying formations of attacking aircraft, extra life at 3000 pts, fuel low warning, realistic explosions. Requires joystick
For the VIC-20 + 3K Expansion.

SPECTRUM 16K, 48K

THE SNOWMAN — An enchanting game based on episodes in Raymond Bigg's amazingly successful book and film
LAZER ZONE — Control two defending spaceships and destroy the incoming aliens. Plunge for the "Electro" button and blast your enemy into expanding clouds of space junk
DRAGONSBANE — A mythical Graphic adventure in the dark and deadly halls of Earthstone Castle. Battle the legendary beasts in order to rescue the beautiful Princess Paula
GRIDRUNNER — Spectrum version of VIC 20 No. 1 best seller
Spectrum 48K (16K).
AQUAPLANE — Aquatic Action.
Spectrum 48K
XADOM — Battle through a sophisticated alien maze in this Arcade Adventure
Spectrum 48K.
3D STRATEGY — A battle of nerves and wits. Faster than a speeding bullet!
Spectrum 16K.
BUGABOO (THE FLEA) — No fleas on this programme. Itchy action
Spectrum 48K.
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A Cut-Throat game of Strategy & Fun
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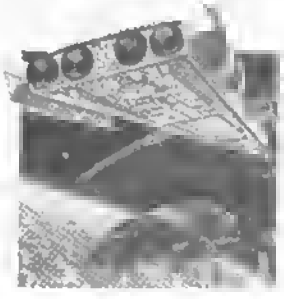

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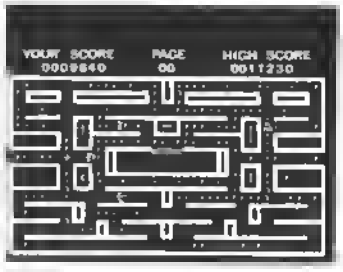
Skim as close as you dare to the surface of the planet, devastating the Martian cities, shooting down the ground to air missiles and UFOs, dodging or blasting the meteorites



ZAPPY ZOOKS
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(For use with joystick only)
Guide Whirly along space corridors, avoiding the Zooks and collecting alpha particles.

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Space attack is a game of skill. You, as the pilot of an intergalactic battleship, have to fight your way through wave after wave of various alien space ships.

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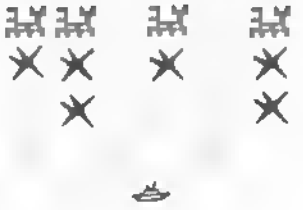
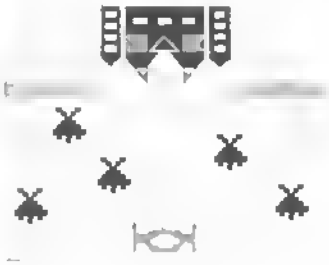


SEA INVASION
For the Unexpanded Vic 20
Fight off the attacking sea creatures for as long as you can. Watch out for the crabs, starfish and octopi.



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For the Unexpanded Vic 20
A computer malfunction throws you off course, where you encounter the evil Sistorian space fortress. You must battle with its various deadly defence forces, then destroy the fortress.

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For the Expanded Vic 20 (you can use 3K, 8K or 16K RAM)
You are commanded for a fleet of destroyers. Your destroyers have to dodge and blast the UFOs. Watch out for the Gologs, they can smash your destroyers but you cannot harm them.

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You are in shark infested waters. Your only protection is an atomic net. Beware of stopping or covering your tracks for too long. Watch out for the octopi.

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For the Expanded Vic 20 (You can use 8K or 16K RAM)
Will you ever be able to defeat Zorgon's minions & evil devices to face the monster Zorgon himself?

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Dicky's Diamond	○
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Stellar Triumph	○
Tombs of Xeiops	‡
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Forth — The Language	
Multisound Synthesizer	

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Alien Break-In (Mod b only)	○

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Convoy Attack	☆
Romik Cube	★
Cyclops	○
White Crystal	*

VIC 20

Martian Raider	○
Shark Attack	○
Sea Invasion	○
Space Attack	○
Time Destroyers	○
Moons of Jupiter	○
Space Fortress	○
Space Escort	○
Multisound Synthesizer	★
Power Blaster	○
Atom Smasher	○
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Alphoids	○
Insector	○
Mind Twisters	★

ORIC

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Galactic Trooper	○
Colour Clash	○
Shark Attack	○
3D Monster Chase	○
Spectra Smash	○
Plus Breakout	
Astroplaner	○
Sub	○

ZX 81

Super Nine	○
Galactic Trooper	○
Bubble Bugs	○
Galaxy Jailbreak	○
Bank Robber	○

LYNX

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Atom Smasher	○
Floyd's Bank	○
3D Monster Craze	○

ATARI

400/800/600XL/800XL

See Saw Scramble	○
Silicon	○

○ Arcade
‡ Text Adventure
* Graphic Adventure
☆ Strategy
★ Family Entertainment

DICKY'S DIAMONDS
For the Commodore 64
Dicky (The Owl) has to retrieve the diamonds stolen by Stephen (The Spider). Catch the diamonds as they fall. A highly addictive game. 70 different starting levels. A selectable skill option for everyone.

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For the Commodore 64
A classic textual adventure set in the Egyptian dessert. Enter the tombs, search for treasures and bring them safely out. Beware the cobra. Over 100 rooms to search!

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SUPER SKRAMBLE
Commodore 64
Well-implemented with beautifully smooth scrolling and very nice graphics.

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Spectrum 48K
A Real-time graphic adventure in the strange world of an ancient civilisation.

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Spectrum 48K
A Real-time graphic adventure where every game is different.

SUPER GRIDDER
Commodore 64
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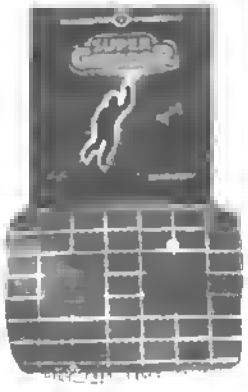

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Simultaneous 2-player action realistic sound.

COMMODORE 64

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With skill and anticipation, dodge through asteroids.

HUNTER
Fast action, where your pursuers gain in speed and intelligence as you master each screen.

SPECTRUM 48K

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SPACE ISLAND
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10 skill levels.
The well-known arcade game in glorious colour.

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Combining fast action with strategy. Exciting. Based on the arcade game.

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Sophisticated 3D maze game.

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Joystick or keyboard.
Unique arcarde-style game.

TERMINAL INVADERS
Keyboard
All the excitement and nostalgia of the original arcade craze.

CURSE OF THE WEREWOLF
Keyboard (Requires 16K RAM Pak)
Every game different.

RESCUE FROM THE CASTLE DREAD
Keyboard (requires 16K RAM Pak)
A test of logic and cunning.

MAGIC MIRROR
Keyboard (requires 8K or 16K RAM Pak)
A classic adventure to test reasoning & imagination.

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Experience fast action and realistic gravity as never before.

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LOST IN SPACE: After having to abandon your spacecraft following an explosion, you are left in your survival capsule to avoid asteroids and hit alien ships. A fast-moving and exciting test of speed and co-ordination. This game features sound, colour and high resolution user defined graphics.

BLACK GOLD: An adventure-style game in which each player operates an Oil Well. The object of the game is to obtain foreign revenue by means of exporting refined crude. The game starts with each player competing for road transport to take crude to the central refinery for processing, and eventual shipping overseas. High-resolution map of the territories and graphics make this programme very enjoyable. Compiled basic and machine language. Disc and Cassette versions.

EVIL ZAPHOS: Zaphos, King of the Zaphians, is trying to invade planet Earth. Using your photon topedo launcher, you must fend off his sometimes devious attack. This game features, sound, colour and high resolution user defined graphics.

BANANA REPUBLIC: As recently appointed president of a small country, you have to attempt to keep all factions happy, of course, failure is rewarded by revolution or assassination! A challenge to anybody that THINKS they could be a head-of-State. Compiled basic and machine language with high-resolution graphics. Disc and Cassette versions.

BOMBER COPTER: A challenging game where your aim is to land your copter safely between the skyscrapers. To do this you have to bomb your way clear but you are losing height with each successive pass. Featuring sound, colour and user defined graphics.

GLOBETROTTER: Travel the world and seven seas collecting souvenirs, the first person back with 7 wins the game! All forms of pitfalls lurk in hiding for the traveller including hurricanes, railroad failures and customs confiscating your souvenirs. A high-resolution map of the world any many graphic features ensure an entertaining holiday. Compiled basic and machine language. Disc or cassette versions.

NINE LIVES: A word game for two players based on the ever popular Hangman. Sound, colour and high-resolution user defined graphics add a new dimension to learning through play.

ARMAGEDDON: A tri-partite battle for nuclear supremecy with the world itself as the bargaining point. The player has the task of placating all parties and keeping the status-quo. Do you fancy the job? High-resolution graphics. Compiled basic and machine language. Disc and Cassette versions.

MOUSE MUDDLE: An anagram game in which you must solve the puzzle before the mouse manages to steal all the cheese. A wide variety of themes are included which would be of interest to a wide age range. Features colour, sound and sprite graphics.

HOLOCAUST: The world is on the verge of total conflict, with three or four players controlling the armies. each person has the task of eliminating the opposing forces. This game is almost purely based on the skill and judgement of each player and leaves little to chance. Again this programme uses a high-resolution map of the world and excellent graphics throughout to aid the enjoyability of combat. Compiled basic and machine language. Disc and Cassette versions.

CHEMTEST: A relatively painless way to learn the 105 elements of the periodic table. Arranged in three sections of increasing difficulty, you have to spell correctly the element corresponding to the randomly selected symbol displayed. This programme features sound and colour.

Latest Addition: TYCOON: A Brilliant game — Ask about it.

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DEBTORS — Runs on a CBM 64 Microcomputer with a 1541 disk drive and 80 column printer (1515, 1525, 1526).

- ★ 500 debtor account capacity utilising 1 data disk.
- ★ Sales analysis of up to 99 classifications grouped in area or department.
- ★ Daily batch entry of invoices and receipts will keep your Debtors Ledger up to date.
- ★ The system generates statements, aged trial balances; overdue and sales analysis reports.
- ★ Standard Rediform Stationery is required except where 1515 printer is used.

PRICE: $250 RETAIL

CREDITORS — Runs on a CBM 64 Microcomputer with a 1541 disk drive and 80 column printer (1515, 1525, 1526).

- ★ 300 creditors account capacity utilising 1 data disk.
- ★ Cost analysis of up to 99 classifications grouped in area or department.
- ★ Daily batch entry of creditor invoices and payments will keep your Creditors Ledger up to date.
- ★ The system generates creditor listings, aged trial balances, remittance advices, cost journals and an overdue report.
- ★ Standard Rediform stationery is required except where 1515 printer is used.

PRICE: $200.00 RETAIL.

GENERAL LEDGER — Runs on a CBM 64, 1541 single disk drive and 80 column printer (CBM 1515, 1525, 1526).
s system caters for a maximum of 299 general ledger accounts and up to 3000 individual transactions. Budgets are retained for 12 months along with monthly figures from last year's trading for comparison.

- ★ Service Accounts — load profit and loss appropriation accounts. Load, change, delete and print accounts.
- ★ Ledger Reports — print out of accounts and their balances.
- ★ Monthly Update — close of the month's transactions.
- ★ Yearly Update — close of the financial year's transactions.
- ★ Post to Accounts.

PRICE: $250.00 RETAIL.

BUSIWRITER — A quality word processor for the CBM 64.
The text resides in the computer's memory and the editor displays the text on the screen.
BUSIWRITER operates in two modes: a) Business b) Graphic.
The user is able to delete text, or blocks of text, restore deleted text, move blocks, use tab functions, enter control characters, set end of text, vertical cursor control, change device unit number, perform arithmetic functions, view the command summary, manipulate files and printing, use mailer function.
Good word processing at an affordable price.
PRICE: $125.00 RETAIL.

BUSIMAILER 64 — A simple but effective mailing list designed to run on a CBM 64, 1541 single disk drive and a 1500 series CBM printer. Used in conjunction with Printlink 64, it will allow you to use any centronics parallel printer such as the EPSON series of printers. The mailing list will cater for 1500 records consisting of a name, an address, suburb, post code, state and a two alpha-numeric digit category code.
A powerful sort is included allowing you to sort and extract records on any of the above fields and use the records as a mailing list, or generate a disk file with names and addresses of selected records to be subequently used with Busiwriter for mail shots; and/or a label printing run using standard two up labels.
PRICE: $135.00 RETAIL.

THE PERSONAL FINANCE ASSISTANT — Allows you to keep track of your deposits and withdrawals; savings, credit card and cheque accounts, etc. You can search for and edit transactions and print out reports or balance sheets.
PRICE: $125.00 RETAIL.

WRITER'S ASSISTANT — An easy to learn word processor for the CBM 64. The Writer's Assistant allows you to configure the programme to suit your own needs, to copy, edit, print or rename a file, format disks, list disk directory, delete, insert, centre, justify, locate and move text, create headings and footings, set and change tabs, adjust top and bottom margins, number pages and so on. The Writer's Assistant readily interfaces with the Spreadsheet Assistant and the Filing Assistant to form a complete electronic office.
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AVAILABLE ON DISKETTE — **PRICE: $149.00.**

DATA HANDLER — CBM 4/8000, 64 — A powerful programming tool allowing the programmer to use machine language power whilst programming in BASIC. Data Handler caters for those functions which are tedious and lengthy to achieve in BASIC such as controlling input from the keyboard and insuring its integrity.
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TYPING TUTOR — Do you feel that your fingers become all twisted and tangled up when you are working the CBM 64 keyboard? Do you feel that it is taking you too long to type up your work? Do you just want some exercises to keep your fingers "in tune"?. If any of these questions are answered yes, then the TYPING TUTOR is a must.
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Fast action graphics and
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FLAGS. A superb educational program. The flags of the world are drawn in hi-resolution colour graphics. The program then tests your knowledge of flags and geography. Have fun while learning.
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TIME GATE
MINED OUT
TRADER
A WORD PROCESSOR
ASTRO BLASTER
ASTRO BLASTER
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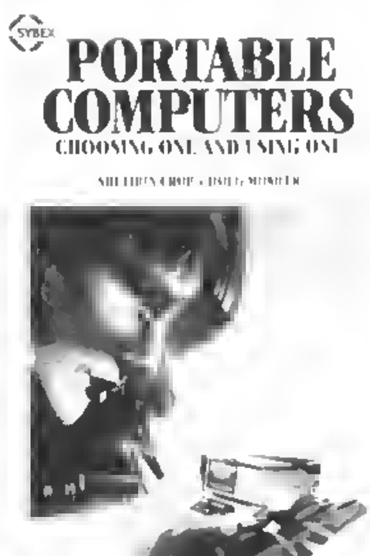

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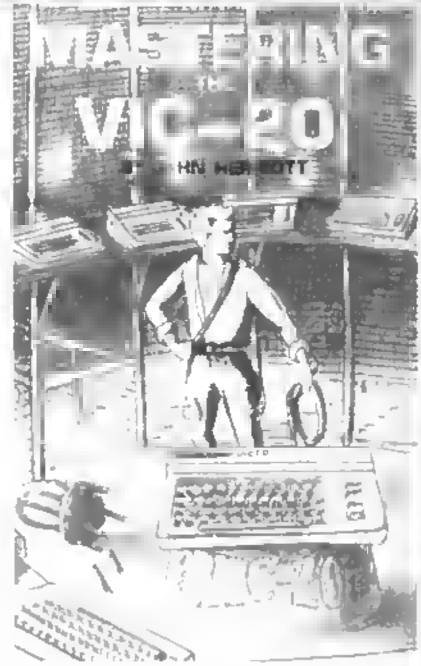

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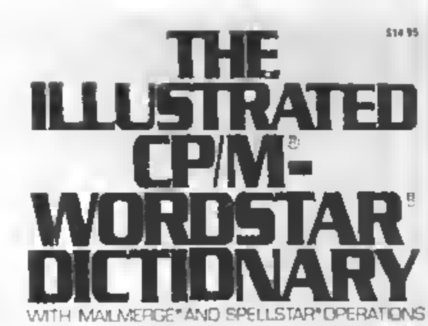

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Advanced Programming for the 16K ZX81 — Mike Costello

Written for those who have had time to get used to their ZX81 and are now looking for more information in order to exploit it to the full. Investigation of the ZX81's operating system, discussion of BASIC subroutines and techniques used in a wide range of programs, including business applications and games. Also the use of assembly language programming techniques and mixing BASIC with machine code.

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The ZX Spectrum and How to Get the Most From It — Ian Sinclair

Takes a beginner's viewpoint to setting up and operating the machine, highlighting difficulties and showing responses to incorrect commands. Guides beginner through difficult early stages until confident enough to start designing and entering BASIC programs. Also a useful reference for more experienced users.

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Amust portable

Plenty of disk room on this one

By John Wigley

Compact computers are in. The size and the area occupied (footprint) are becoming selling points. With its briefcase size case the Amust Executive 816 is at the top of the table.

While the computer is small, the disk capacity is large: 790K bytes per disk. As it has twin disk drives this is a total of 1.58M bytes. With this large disk capacity is included a small, 125mm screen. The characters are well defined. The contrast of this green screen is good, so that it really can be used at home without needing a larger monitor.

The Executive 816 is housed in a well-finished executive style case, complete with combination lock. It weighs kilograms, so do not attempt to carry it very far! Lift the case on to a table and open up. On the right are stacked the two disk drives. In the middle is a screen and on the left a brightness control for the screen, a reset button, a power switch, and the screen release, which lets the screen angle up to about 20 degrees, just about correct for viewing.

The back panel contains all six of the ports: a keyboard connector (serial mode); an RS232 serial port connector; a parallel printer (Centronics) connector; an 8" floppy disk drive connector; a hard disk connector, and a 'Mouse' connector. The 'Mouse connector' is most intriguing. Are we to be overcome by a plague of Lisa type mice?

Also on the back is a line voltage selector, with a protective cover and an input plug for 12V DC.

On the top is a receptacle for an Instant User guide. This small book is crammed with useful information all printed in type the size used for the conditions on an insurance form. In the front panel is a small slot, sufficient to hold a few disks. The keyboard is separate and attaches with a long coiled cable. A numeric keypad on the right has five additional keys and the four cursor control keys. Along the top are five function keys. The angle and feel of the keys is good.

The colour is executive black.

The Amust Executive 816 . . . top of the table

The Software

A short while ago the typical software package consisted of CP/M, some sort of 8ASIC, and if you were lucky, a few utilities. Now each manufacturer aims to include as much as possible. The Executive 816 has quite a bundle: IMS accounting, project costing, membership system, office costing, ARM database, SuperCalc, SuperWriter and DEAD.

DEAD is a disk editor and diagnostics package that has been set up so that a novice or beginner can use it. It works with CP/M and lets the user check disks for bad sectors and then hide them, and also read files and edit them. It is the only time you need to know that CP/M is being used. The rest of the software is menu driven (a menu appears on the screen and an option is selected by means of a single letter). This is easy to use and saves learning obscure commands. For those who want it, CP/M is available from the menu.

SuperWriter is a word processor and spelling correcter combined. It lets you type in letters or forms and then edit them as needed, correct the spelling, format them lon screen if required) and print them. Half finished letters can be saved and completed at a later date. Once you have learnt how to use it, any other method is passe.

Once again it is menu driven and easy to use. Help screens are available if you get in trouble, and these can be called up at any stage. This feature helps learning to program, avoiding constant reference to the manual. Forms can be set out and there are many options and features too numerous to mention. It is also able to pick up Data from SuperCcalc.

SuperCalc is a spreadsheet. Ideal for reports, financial workings, and all the things that management love to spend time on. Again, the program is menu driven and help screens are available. This version seems tidier and easier to use than other spreadsheet versions used.

ARM Database is a data-filing and manipulation program. Data is stored, listed, sorted, relisted,

Microcomputer Summary

Name	Amust Executive 816
Processor	Z80A at 4MHz
ROM	4K (monitor)
RAM	64K (60K usable)
Input/output	2 RS-232 ports, one used for the keyboard. Centronics printer port. Disk drive 8". Hard disk drive. Mouse port. Video output. 12 v DC input.
Keyboard	Serial type. QWERTY with numeric keypad and cursor keys and five function keys.
Display	8uilt in 125mm screen. 80 x 25 green type. Emulates ADM-3A.
Software	CP/M 2.2 with package (see text).
Peripherals	Disk drives as required including Hard. Screen. Mouse.
Price	$6175.00
Reviewer's ratings	Documentation 4, ease of use 4, operating system 4, expansion 4, value for money 3.

Review machine supplied by Computer Warehouses, Ltd, 10 O'Connell Street, Auckland.

HARDWARE REVIEW

printed, and moved around in endless combinations. It is not as powerful as some databases but would be quite adequate for most users. Once again it has been tailored for the Executive 816 and is easy to use.

Office costing and project costing would be very useful for a small engineering or similar business. With these programs it is possible to cost out the time spent on a job and the number of people involved and readily produce costings. These two programs are not startling in concept but most offices would find a use for them. Definitely worth while.

The IMS accounting package is a small business accounting system. A stock control package is included, with accounts receivable/payable, and the general ledger, which includes a profit and loss and balance sheet. This package, while suiting a small business, could also be used for branch, or internal accounting, in a larger business.

Utility programs are provided to allow communication between any computer that will run the special communications package, and a program allows the Executive 816 to read CP/M disks from other machines such as the Kaypro, Osborne, DEC Rainbow, I8M PC and so on. (Just beware, reading is not understanding!)

To go with these programs are a number of instruction books. These books are well bound, give plenty of information, and are a definite improvement on some I have seen.

Summary: This is an Australian made and designed computer. Used with a normal screen in the office it can be taken home and used quite happily with the built in screen. As it is packaged it represents good value for money. A comprehensive range of software is included and the hardware has all the necessary bits and pieces. A nice package.

BBC add-ons

A Z80A co-processor board (including 64K of RAM) for those who want to run CP/M software is now available for the BBC. The Torch board (from the same stable as the Torch disk pack which also has a Z80A but includes twin disk drives as well) plugs into the Tube interface and is available for $1480 from New Zealand agents Tower Computing (P.O. Box 25-091, Christchurch). Tower also has available a hard disk for the BBC (see BBC column) starting at $8500 (education price $5950) for 10 megabytes.

Revolution! in primary schools

By Brian Sullivan

Tony Robb and Rebecca Burgess, of the Kaiapoi North School, playing Alphabet Squares.

In very recent times an exciting revolution has been quietly gathering momentum and spreading through our primary schools.

For many years it was considered that children first, learn to talk, second, learn to read, and last by far, learn to write down or record. In fact, some children never master this last skill. The plight of the non-reader is also well known and has been widely documented.

Since writing was first taught, teachers have been trying to encourage children to put a mark on paper, or clay tablet, or leaf. Many teachers thought that topics stymied the children, so lots of topics were found to assist the children to fill the page. Teachers would regularly, once or twice a week, trot out a topic and say "go to it" in effect. An example: The Most Unforgettable Character I Ever Met Was . . . There were and still are brightly coloured books full of elaborate ploys to motivate, or cyclo-styled sheets already with an illustration and the first sentence.

I can remember those panic-stricken times as a pupil myself, looking at a beautiful, blank, white page and finally writing some stilted, stumbling, stricken prose. It was many years into adulthood before I picked up a pen again and started to find my "voice".

Professor Donald Graves has turned all that on its ear! Since 1972 Donald Graves has been studying how children learn or acquire the craft of writing.

He and his co-workers discovered (some say re-discovered) that when children start school they have an exceptionally high confidence in their ability to write. Higher than their reasonable assumption that they are going to learn to read. Further, it was subsequently found that if this confidence is nurtured and encouraged the children in most cases will develop fluency in writing and reading together.

Children in many classrooms up and down New Zealand are now spending upwards of 30 minutes every day writing stories about things that they want to write about.

Wait! I hear you say, or I hope I hear you say. What about children who can't spell, don't know capitals and lower case, full stops, commas and all that other stuff?

Don't stop their enthusiasm, but help each child to his or her own ability. If a child can't spell go one step back, see if he or she can write the first letter. If children can't physically form the letters then write the words they give you and then let them copy or go over that. What is important is that the story is theirs! Once the story is down then progress on to the next step for each child.

The children write down their story if they like it, they correct it, and if necessary make another copy. In discussion with the teacher they make a series of draughts before they come up with the final copy which they can then publish by keying into the word processor (computer with suitable software booted). They can type into a word processor?? What! Five to seven year-olds? The short answer, yes!

The computer is a System 80 using Scripsit word processor. The monitor is set at the 32 character width screen format. The actual word processor at 30 width for screen, and the right margin and left margin are adjusted in the following settings: R.M. 4 and L.M. 34 and double spacing. The printer is a C.Itoh 8510 and is set to double-size print.

In the accompanying story written by Brigit, aged six years seven months, you can see how this turns out on foolscap paper. The story, incidentally, will be known to many younger readers from their own early days.

Last year was the first time that I introduced the computer into the classroom on a regular basis.

I was aiming for one day a week

but the popularity and the amount of work and time that children wanted to spend with their work obviously meant I would have to double this time. I now regularly use the computer twice a week, on Tuesdays and Thursdays. A brief synopsis of how the computer is introduced during the year is probably the best way to show you how I intend it to be used.

Story, graphics and turning pages

During the first term I introduce the computer and we have a story on the screen with moving graphics to make it interesting. The children read the story together with the teacher and different children turning the page, just an ordinary shared book approach. Except, that here the child turns the page by using the space bar and in this particular story (Billy Goats Gruff) the goats walk across the bridge and the troll jumps up to stop them.

Needless to say, this is enjoyed by children, who come back time after time to read the story, and pretty soon they know what a space bar is.

Along with this we have our very own home-grown game (previously published) Alphabet Squares. On this game up to three children sit at the computer with an alphabet in front of them and try to guess or find out what letter comes after or before a letter displayed in a box on the screen. Pretty soon these children know where the letters of the alphabet are on the keyboard; this is the purpose of the game. On this program I have added a sound routine so that if a child gets stuck and keeps answering incorrectly then chords very much like Beethoven's Fifth boom out and then I can help, or better still one of the other children can help.

In the second term we start publishing stories (print-outs of what the children have keyed in on A4 paper; these the children then illustrate and display). These are of sufficiently high standard at first to encourage everyone to try well. Although I know that some children are working to their capacity I need early on to find some children who will become experts and help others as editors. That is what they become known as. The job has status and is sought after by many. By the end of the second term every child will have typed in, with help where needed, at least one story.

In the third term I find it difficult to get space to display all the stories.

A nice development has been sharing reading their stories to the class. Children then can tell the author what they think of his or her story and the author can thank them for their comments.

My first thought was that the computer would be a great carrot to motivate, and this has been so. Children are clamouring to be the next to get their story printed and "published". It is common to hear children saying, "Oh! Goodie, time to write stories;" or "Mr Sullivan, we haven't had story time yet."

The word processor goes further than that.

A test to feel the difficulty children have

Some children find it extremely difficult to write letters. If you wish to get an idea of how difficult it is for them, sit in front of a mirror and try to write intelligible prose by looking through the mirror. It's difficult but possible.

Now do the same thing with the hand that you don't normally write with. Not so easy?

These children have not yet developed the finer motor skills to achieve this, but they can find a "voice" and write. Using a word processor they need only push the

Leigh Adams and Kurt Bayer, of the Kaiapoi North School, type in their story. Leigh is the editor.

required key and they are away.

Some children sit fascinated and just type the letters. Even for them the processor has another advantage. It is locked into a language format, it always starts at the top left hand corner and progresses to the right; it simply cannot start at the bottom of the page unless the writing has got down to the bottom of the screen.

The computer is a valuable tool. I can teach without it, but I can improve the language experience of children with it. It is my firm belief that here in the primary school is where computers should be, if for nothing else than the sheer motivation that they bring about.

The word processor, the Three Billy Goats, and the Alphabet Squares are a few of the programs I have used in the classroom, but these are the foundation and the others are extra and aimed either at individuals or groups of children with an identifiable need.

One group of children have a need for a small reading word vocabulary commonly called a "sight" list which is just what it is these words the children need to identify by sight. I am using a program which brings up these words in giant size letters slowly a letter a time across the screen. Each word is followed by a sentence. For example; three dashes are shown - - - in the top left hand corner. Directly underneath them the giant upper case letters appear: T H E one at a time slowly. After that the three dashes appear at the bottom of the word so it looks something like this

T_ _H_ _E

After this a sentence is shown, in this particular case after *the* is shown comes the sentence *the cat*. The sole purpose is to learn the words and to get the idea of direction. The status or glamour or whatever that is associated with computers is all the motivation they appear to need. And I suspect that it is fun, and learning can be and should be an extension of play — it is how a young child learns.

Another program for children who need to extend their reading vocabulary is based on the idea of a Tachistoscope, where a word or sequence of numbers is flashed on to the screen for a set time.

If the child can't type in the matching word then another word is shown at a slower rate until the child succeeds. When this happens it starts to increase again until the child can't see it and it slows.

This program runs on a bank of words from the Dolch list, a fairly elementary list of words known to all teachers. This program, with a voice synthesiser, would be of immeasurable value as a game for children to play and learn both by sight and sound. Is there any sponsor out there?

The only computers in primary schools have been put there by the teachers themselves, and I cannot afford disk drives so carry on with cassettes.

I have been using a computer in my spare time to make and develop programs because I can see the benefits, and other teachers have been doing the same. But this takes a lot of time and to develop software requires quite a lot of "hands on" experience which you don't get if the computer is sitting in a cupboard at school.

I hope not too many computers are going to be bought in the heat of the moment and then left when the enthusiasts move on. Having a computer in the classroom doesn't make teaching any easier. It presents a whole new set of relationships in the class and if your class isn't going too well then forget it! This is no panacea for good, old-fashioned teacher interaction. It is only an adjunct and a very useful teaching tool.

In my initial use of the computer in the classroom I have concentrated on using it for language rather than for mathematics. The main reason is simply because most people associate computers with number crunching or arcade games.

I have steered clear of both though I have them up my sleeve and have used them on very special occasions like class parties and stalls at school fairs.

I hear that most computers in high schools are used for applied maths. I hope I'm wrong, their value in the English Department is immense. To keep pupils locked into programming only is short-sighted and certainly in the primary school computers' main use will be with developed software as learning machines.

Brian Sullivan is a primary school teacher at Kaiapoi, North Canterbury.

One for Apple

An American Government Department has dealt a blow to Apple copies imported into North America. The United States International Trade Commission has ruled that micros from Taiwan and South Korea, selling in America as the Orange and Pineapple respectively, infringed Apple patents on its operating system. Imports of the computers, which have been selling at a third of Apple's prices will be banned.

Chairman retires

Mr Thomas Watson, aged 70, has announced he will not stand for re-election to the board of IBM this month. After joining IBM in 1937, Mr Watson has been president, chief executive, chairman, and his present post of "chairman emeritus."

Now it's the 32-bit plateau

By Nick Smythe

With last month's release of the Apple Macintosh and the announcement of Clive Sinclair's QL, both based on the Motorola 68000 processor, the microcomputer world began to lift itself in earnest on to a new plateau of performance: the 32-bit plateau. Although the early 68000's and similar chips were originally classed at the start of the 1980s as 16-bit processors (on the basis of their 16-bit data bus) the jargon is now of the 32-bit micro for these chips (even where their data bus is still 16-bit). We may not approve of the advertising hype but let's adopt it for now.

The new 32-bit machines leave the micro user in a three-level marketplace. At the lower end are the 8-bit faithfuls, most endowed with software ready to solve almost any problem that lies within their processor power. On the top of these lie the largely Intel-based 16-bitters with a growing software availability and enhanced power. Of these the IBM-PC has proven dominant, while a few others such as the Sirius and NEC APC have carved out significant niches for themselves. Finally the 32-bit machines come new to the software scene with a raw power jump that makes the previous transition from eight to 16 bits seem a relatively small increment.

The 32-bit processors (of which the 68000 and the somewhat more powerful National Semiconductor 16032 are best known) offer considerably enhanced processing power, enlarged memory range and, perhaps most fundamental, an enhanced architecture. Typically, their clock speeds may be up to twice those of their 8088/8086 counterparts, and their potential memory range is 16 times the size (up to 16 megabytes). The comparison figures will depend on the particular variant of the chips being considered. The memory is also addressable as a single extent through 24 bits from a 32 bit register.

This compares very favourably with the 8088/8086 family, which uses a 16-bit register plus a 4-bit offset for addresses. In effect, this arrangement means the RAM is set up in 64K blocks and the software user has either to work within the limits of this or consciously define the current 64K section he is working in. For instance, an 8086 8ASIC may use one segment for its interpreter, one for the program, one for string variables, one for numeric variables, and so on. You can handle some larger programs than on an 8-bit machine (where all of these must fit into 64K or use paged memory) but you can still knock your head on the ceiling long before you fill your potential megabyte of storage. With the 32-bit chips the memory can be more flexibly configured as a single block. In addition, the machine-code

The Macintosh

commands are of far greater scope and power.

The shift is such that the 32-bit machines may well represent a plateau for much microcomputing. With associated new peripherals, discussed later, the spare power and space in this family of chips could arguably provide more than enough room for the slower-to-react software industry and user community to play around in for the rest of the 1980s.

Even beyond that, many of the new driving inventions of microcomputing may well run on similar chips. One might suspect that for many small users the trends of recent years, where new processors have thrown up new dominant products, is past. Already software is a dominant factor in machine choice. In the near future software

may combine with the market control to assemble a package of new peripherals (such as laser disks and cheap, high-resolution colour monitors) and ancillary internal hardware (such as graphics chips) to define winning machines. The processing base, however, may well remain the 32-bit chips.This power will become cheap enough to fill the Christmas stocking for junior, but strong enough to handle almost all tasks outside of research and big business.

Apple Macintosh a major development

None of this should be news if you have read past issues of *Bits & Bytes* (See October, 1983). What brings it back into prominence are the two recent releases mentioned above. The Apple Macintosh is a major development, mainly because it comes from Apple and was expected to be a cheap, popular computer: an upmarket adjunct to and eventual functional replacement for the widely used and much loved Apple II. Yet it has some unusual design features that raise issues that invite us to look at the wider issues of the marketplace it finds itself in, and the needs of the user in that marketplace. What does the Macintosh tell us about Apple's view of the microcomputer scene and about current microcomputing myths?

First, Apple believes in the 32-bit plateau and believes in the limitations of the 8088/8086 family. Its market strategy has been to skip the transition phase from 8-bit to 32-bit microcomputing. That has meant ceding a lot of ground to the conservative product and hypnotic three initials of IBM. However, it may prove worth while because Apple has an advanced idea of what the 32-bit plateau should mean and getting there first may have a great deal more to say for it than leading the transition phase.

In this skipping race the Lisa has been an image builder: released initially as much to prepare the user community for advanced user interfaces (from Apple being the key point) as actually to make large sales. The concepts of Lisa were to be ported down to the Macintosh and also to the Apple II through Mouse II, a mouse and peripheral card bearing the same pull-down menus and windowing concepts of Lisa in a reputed 80K of ROM. In this way the skip could also perhaps prove to be a squeeze on the 16-bit market from below as well as above.

The second principle grasped by Apple was that industry standard operating systems and user interfaces were inappropriate concepts for mass computing; concepts begotten by software designers too versed in traditional practices. Who actually likes using MS-DOS, PC-DOS, or (shudder) CPM-86? How many comparative reviews of these systems end up by saying one or other is better, but the better of a disappointing pair! Apple opted for a user interface fully realisable only with computing power far greater than an 8086 could provide. The glorified graphics playground, rich in icons and metaphors that Apple has chosen for its 32-bit family user interface and operating system, set it poles apart from any of the legion of pre-existing 68000-based machines.

Why have the Corvus Concept, the Fortune 16/32, and their compatriots failed to make impact? Essentially, they were too dear and too similar. The companies behind them took the easy step of designing a 32-bit microcomputer but never considered the best way of using their additional power and never had the resources or courage to write the software to break the moulds established by minicomputers and the 16-bit chips.

Compatability is not everything

A similar stance is that compatability doesn't mean everything. Starting off with the ability to run neither IBM-PC nor Apple II software the Macintosh simply accepts that you do not get the best from a powerful system by adopting existing software designed within the constraints of less powerful processing. A lot of the early 16-bit software was just that: B-bit material ported across and performing suboptimally. The Macintosh design philosophy makes a clean and totally appropriate break. The Macintosh is raised here because, fail or not (and for the sake of courageous men, I hope not), it represents a refreshing and radical application of intellectual aesthetics: it is elegant, fun, and innovative. There are still too many unknowns about it to praise or condemn it, although with its initial demonstration software it is great value for a wet afternoon. There can

The Lisa

be little doubt, however, that it is at the cutting edge of a new generation of microcomputers and they will sell and be useful by fitting the operating systems and user interfaces to people's needs and intuitive ways of working.

One significant question must surely be, 'Who has similar packaging under wraps?' If the answer is no-one, or no-one with anything ready for a year, Apple will be on a clear winner. Having seen an IBM-PC and a Macintosh in a room together two images come to mind. One is an evolutionary tree, with MS-DOS being the branch of Neanderthal Man. The other is of a 1950's gas-guzzling De Soto alongside a trim 1980's coupe.

In its present form the Macintosh is short of memory, rather slow on printing, and limited in disk capacity. It will blossom through 1984 and 1985 as cheap laser printers, colour monitors and high-capacity disks become standard and higher This is not so far away now. The first laser disks have been released in Britain at a price of £5000 (about $NZ11,000) a drive and £200 ($NZ440) a disk. Storage is 1 Gigabyte with 1 Terabyte versions predicted. At present you can read files endlessly but write just once to these drives. Some quick arithmetic shows that the disk capacity is equivalent to 5000 low-capacity floppies and the cost is equivalent to 25 cents a disk. This is right at the start of production when competition and high volumes have not even started to drive prices down.

However, even now the Macintosh's real contribution is in its kernel: the way that its processing power has been harnessed to friendlier computing. As all the peripherals fall more into line with (or excede) the power of the core, users will begin to consolidate on the 32-bit plateau using the power in just this way.

What about present and upcoming competition? For other 32-bit manufacturers the battle will be on to win the hearts and minds of the software authoring community. Machines such as the BBC (with a 16032) can provide the processing punch during 1984. However, can they also provide the similar software interface for the user, and if so when? What of Sinclair and, meanwhile, what of the 16-bit fraternity? They will continue to provide solutions off the shelf and enjoy a considerable advantage for many applications for some time. A good 16-bit machine will solve a lot of problems quite adequately, as, in fact, will a good B-bit one. However, prices will tumble and it will be interesting to see who and what gets squeezed out. The real knell for these machines will be when their processing power becomes inadequate against the improving capabilities of new peripherals that are widely available and affordable. Then they may be too cumbersome for the home user and too slow for the professional. In New Zealand that could be some time off yet.

A final thought in all this cut-throat chaos. How will Mr Merv Wellington handle all this change with micros in schools? Already his list of five has become a de facto list of two, and in spite of the dated and secretive nature of the report on micros for schools many schools are ignoring quite adequate machines because they are not on the list. Pretty soon someone in Wellington is going to have to face the problem of new recommendations.

Most inconveniently, the world outside is producing QLs, Peanuts, and Macintoshs. Can the political will be mustered to cull some machines from the old list? Can new machines be added to it? As the 32-bit plateau approaches the technology will probably continue to outpace the response of many of the institutions utilising it. However, it is to be hoped that the adaptation is even easier and this time the plateau will provide a better breathing space.

Business plotting

Sirius Systems has developed a package of business-oriented plotting programs for use with microcomputers.

The new package will be known as Schema and is written in BASIC for easy implementation on a wide range of hardware. Techniques have been incorporated to facilitate rapid adaption for most plotters.

Data may be drawn in any of the commonly used graphical presentations; pie-charts, line graphs, or histograms. Also included is the means to create diagrams or pictures from a combination of geometric shapes.

Bit Stik

Low cost step into design

By RICHARD SIMPSON

The Bit Stik is sold as an interactive input and control device designed to be used with an extended Apple II. It consists simply of a three-buttoned black box with a joystick that is based in a swivelling dome, and the relevant software stored on floppy disks. The market is aimed towards architects, designers, artists, draughtsmen and engineers. At present in New Zealand, most interest has been shown by Engineers.

The joystick directs the x, y movements of a small cross (representing the cursor) about the screen. In addition to this function the joystick features a rotatable knob at the tip of the stick. Functions of this knob depend on the current menu selection and include the thickening of lines, changing of window dimensions, and altering the radius of a plotted circle on the screen.

The accompanying buttons have a number of purposes, including the selection of options from the menu and picture unit library (contains sets of symbols, e.g. the set of analogue electrical symbols to help in circuit drawing), and initiating actions such as drawing a line, etc.

Using the Bit Stik the user can copy and manipulate stored picture units from the library disk. This makes it simple to build up quite complex designs. Further tricks using this system include trailing (gives a time lapse trail of a translating object on the screen,) drawing arcs from three specified points (start, finish, and a point on the arc), and compression which is effected by altering the x:y ratio.

An important capability of the Bit Stik is its capability to zoom in on detail. In this procedure a window is directed about the screen by manipulation of the joystick, to select the portion about the screen to be enlarged. This is a very useful feature since it compensates for the poor resolution available on typical monitors or TV sets.

A work disk is used to store copied picture units, complete pictures or screen images. Pictures and screen images may be plotted or printed as many times as the user wishes.

The equipment required to make full use of the Bit Stik is set out below with the current approximate New Zealand prices:

Bit Stik	$1500
64K Apple IIE, Colour monitor, Disk drive	$4781 (package deal)
Extra disk drive	$1113
Hewlett Packard and 7470A plotter (and interface)	$3066 (A4 size)

* Graphics tablet $600-$2000* NB. Optional extra - only required for use of Bit Stik's Trace option.

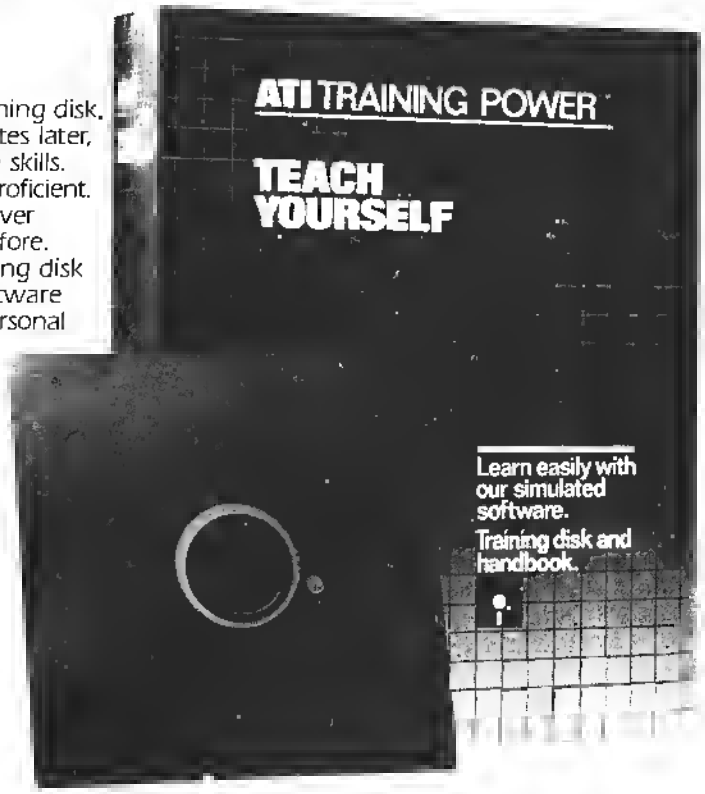
Thus the Bit Stik provides the user with access to computer aided design (CAD) facilities for about 20 per cent of the cost of some of the more advanced systems at present available.

Documentation is provided in the form of a reference manual and an introductory booklet called "Quickdraw". Service facilities are available in both Wellington and Auckland.

Bit Stik: main menu options

Draw	Display drawing palette and control drawing functions.	Zoom	Select a portion of the drawing and enlarge to fill screen.
Paint	Display paint palette and colour fill areas of page.	Page	Re-draw the complete picture at the original scale.
Trace	Input via graphics tablet.	Full	Clear the menu to allow drawing on that portion of the screen.
Erase	Erase elements of drawing.	Digit	Display the digit menu.
Find	Locate end points of lines.	I/O	Display the input/output menu for storing or manipulating files on the work disk.
Move	Move a picture unit.		
C & LT	Change the colour and line type of drawings.	Misc	Miscellaneous menu; for text, storing a zoomed area, or starting a new session.
File	Save the drawing on a library disk.		
Copy	Select a picture unit from the library disk and copy to the drawing.	Wipe	Clear the page and new data from memory.

Teach yourself software in minutes. Not hours.



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- ☐ EasyWriter II
- ☐ Perfect Writer
- ☐ Spellbinder
- ☐ Benchmark

Operating Systems
- ☐ PC DOS
- ☐ MS DOS
- ☐ CP/M

Financial Planning
- ☐ Multiplan
- ☐ SuperCalc
- ☐ VisiCalc
- ☐ Perfect Calc
- ☐ EasyPlanner
- ☐ Microplan

Programming
- ☐ BASIC
- ☐ APPLESOFT BASIC

Accounting
- ☐ BPI Gen. Acct.
- ☐ Peachtree General Ledger*
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Help from Boolean algebra

By Steven Cragg

The ZX Spectrum has been criticised for its lack of an ON – GOTO/GOSUB facility. However, with a small amount of programming this can be easily rectified.

The way in which this is done relies on two features – the computed GOTO/GOSUB and Boolean algebra. Boolean algebra has many uses and a working knowledge of it can only improve your BASIC programming.

To understand how Boolean algebra works on the Spectrum try the following program.

Note the brackets are important.

```
10 LET X = 10
20 PRINT (X =10)
```

You may be surprised at the result as after running the number 1 gets printed on the screen. If you now change line 20 to

```
20 PRINT (X = 20)
```

and run 0 gets printed on the screen. The reason for this is as you may have guessed, is Boolean algebra. The 1 corresponds to the condition in brackets being true and the 0 corresponds to the condition in brackets being false.

It should be noted that the condition does not have to be of the (X = . . .) variety. Indeed it can be any condition that could be put in between IF and THEN in an IF. . .THEN statement. The only constraint is that you must enclose the condition in brackets.

Some examples of conditions are:

```
(X = 10 AND Y = 15)
(a$ = "Hello" OR B = 0)
((Z< 0.5 OR V = 55) AND j =6)
```

Note how they can be used with any type of variable.

Now on to how they can be used in GOTO's and GOSUB's remembering that if a condition is true then it produces a 1 then a line such as

```
GOTO (X = 10)*500+(X>10)*600+(x<10)*700
```

can produce a jump to lines 500, 600 or 700 depending on the value of X in the program. This comes about as X must either be greater than, less than or equal to 10.

GOSUB can be used in exactly the same way as the GOTO. The advantage of using computed GOTO's and GOSUB's instead of an ON-GOTO/GOSUB is that you can test for any type of variable and for any value.

When using the above method in a program be careful that you cover all possibilities of the destinations of the jumps. For example:

```
100 GOTO (X=10)*100+(Y+5)*193
```

At first glance it may appear that the only lines that can serve as destinations for the jumps are lines 100 and 193. However, what about if both the conditions are true? Then the program will jump to line 293. Also if both conditions are false the program will jump to line 0. This sort of eventuality must be planned for.

So now you have seen one use of Boolean algebra, but for the games players/writers among you the following lines are probably familiar.

```
100 IF INKEY$="5" THEN LET X=X-1
110 IF INKEY$="8" THEN LET X=X+1
120 IF INKEY$="6" THEN LET Y=Y+1
130 IF INKEY$="7" THEN LET Y=Y-1
```

However, this can be much shortened by the use of

```
100 LET X=X+(INKEY$="8")-(INKEY$="5"): LET Y=Y+(INKEY$="6")-(INKEY$="7")
```

With a small amount of thought conditions for keeping the object within the confines of the screen can be incorporated for example –

```
100 LET X=X+(INKEY$="8" AND X <31)-(INKEY$="5" AND X 0)
```

Both of the above are faster and less time consuming to type.

The final use to which I am going to apply Boolean algebra to is a recursive FOR-TO-NEXT loop. I apologise in advance for what can be considered bad programming practice, but it has an advantage over other methods, speed. The method I am going to use relies on the capacity of a FOR-TO-NEXT variable to be reset inside the loop.

For example try:

```
10 FOR X=0 to 2
20 PRINT X
30 LET X=1
40 NEXT X
```

Break after running as this loop will never end because X has to reach 2 to exit the loop. However, this can be used to your advantage. To see how, try the following program:

```
10 LET Y=1
20 FOR X=0 TO 1
30 LET K=K-1
40 LET X=(Y=10)
50 NEXT X
```

As you can see line 40 resets X to zero each time, as long as Y remains less than 10 and thus the loop continues. However, as soon as Y=10, X is set 1 and the loop is exited.

I hope this short article has helped you gain a working knowledge of Boolean algebra and the uses to which it can be put.

Misleading Advert

An advertisement that appeared in the February issue of BITS & BYTES under the heading "Avoid Sales Tax" was misleading. It is not possible to avoid sales tax.

Hard disk from PACE and ED-NET

By Pip Forer

The time has come for the long-promised hard disk report, and so the friendly interface article will continue next month. Ten days ago I had the opportunity to examine the 10 megabyte hard disk from PACE and to get some initial information on ED-NET, an alternative networking system to Acorn's Econet. Tower Computing, of Christchurch is the agent for PACE and has imported the hard disks along with PACE and Watford disk-filing systems. Here are some reactions to the system.

The hard disk itself is currently a fixed-disk system housed in a substantial and rugged case. The manufacturers are reported to have developed the system under a military contract, and it is certainly well built. If you want to run a single BBC computer with a hard drive the user simply replaces (or augments) the DOS sideways ROM with a hard disk filing system ROM (accessed by *WFS, for Winchester Filing System). The hard disk can then be used.

Like many systems using hard disks on micros the operating system essentially divides the disk's area into a series of virtual disks, termed in this case sub-drives. These behave exactly like a floppy drive. New, if somewhat confusingly named, operating calls of *GOSUB and *GOTO allow the user to access a particular sub-drive. Sub-drives can be defined in a simple hierarchy with drives at a lower level on the hierarchy being accessible from the next level up. Any sub-drive can vary in size from 5K to 1 megabyte but there are advantages for back-up in keeping below your maximum floppy storage capacity unless you are backing up to a fast tape spooler or videotape through your own software.

Apart from this the user can employ the same disk commands as the PACE extension of BBC DOS, which makes for easier program creation and development for someone already used to the system. It also allows the user access to 15 character file names, but not the full directory structure promised by Level III Econet file servers. The WFS ROM also provides some additional commands including ones to back-up sub-drives to a floppy and another to "revive" a floppy on to the hard disk system intact. Since you can use *DISK and *TAPE as well as *NET or *WFS you can also down or upload individual files quite easily using floppies.

The market for a stand-alone system on a BBC is limited, but considerable interest may be shown by schools with networks. Against the fixed disk system is its cost and the problem of backing up. On the other hand the larger storage and fast access make it attractive for a network data base. With the PACE system the hard disk can be networked if the machines use an EDNET rather than ECONET ROM system. The hard disk can then be shared among users. This is very conveniently achieved with EDNET by allocating each user a private sub-drive and also allowing access to a common area of library programs. This allows both shared resources and private work space. Access to the system is controlled by a password and status on the system by a priority level. This priority is set by the system controller for each user and can be used to allow preferential access to files and utilities for particular users. The available controls are pitched at a nice level for simple school use: relatively powerful but not too complex.

Although the WFS is running in Christchurch the EDNET systems had still to arrive so my comments are based on advanced documentation. This is comprehensively laid out for the first-time user and, from experience with the WFS documentation appears likely to be reliable. From this documentation the system seems generally attractive. There are some particularly nice features

of the EDNET/WFS implementation. Printers, for instance, can be run from any work station without an additional ROM, but with only marginal impact on the work station being used. A command *MEXEC allows multiple users access to an EXEC file (not normally possible under Acorn DOS as EXEC files are, inappropriately, opened for update during use, thus denying multiple user accesses). Commands such as 'NETOFF, 'NETON, 'SHOUT, 'TELL, and 'REPORT extend the facilities available to users under Econet level 1 and allow greater control of the network by a supervisor (*SHOUT, for instance, broadcasts a message to all network users).

In the context of a school network (or any network for that matter) EDNET with WFS offers an easy-to-learn path to operating a shared, large central data base or a centralised receptacle for the workspace of many individuals. It is a robust product with a simple and clear software design philosophy. Certainly it is a great enhancement on ECONET level 1 (the small file server) but that is a limited datum for comparison. The great disappointment for me is that there are no true hierarchical file names as ECONET III promises.

The other consideration is that while the system closely parallels Econet the two are not entirely compatible. A network on this system would be a part of a slightly different user community and software source community than an ECONET one. For many purposes this may be of no concern at all. For class programming, for instance, either environment would apparently be suitable. The main question would be how much you intended to use CAL software tailored to a network environment in terms of using inter-user communications or saving mark files.

It seems on the surface that EDNET and ECONET could both handle the needs of such a user but would do things in different ways. However, one major point in its favour is that, without the need for a second processor, the system is available now. PACE has managed to steal a lead on Acorn again and has managed to get this to the English and New Zealand markets in time to tempt significant response from users.

Next month, more on friendly interfaces.

Dragon's Eye (for Apple II)

Dragon's Eye, from Epyx, for the Apple II. Reviewed by Nick Smythe

Adventure games for the Apple are now fairly numerous. The standard sequence involves a quest for adventure that involves numerous conflicts with monsters, occasional use of magic and all too frequent death for the player. The designer of an adventure game has several options open to him or her in creating a fantasy world within the constraints of a home computer. Many early games opted for simply using text to describe the sights and riddles the adventurer encountered. Latterly graphics entered with the player being shown maps, views of the land or the maze they are in. Some designers have also included an interactive sequence of combat where the player chooses how to wield weapons and sees the combat depicted on the screen.

Behind this needs to be a set of puzzles and challenges that are consistent and interesting, in addition to which the whole exercise needs to run at a reasonable speed.

Dragon's Eye sets out as a standard scenario with a single player adopting the guise of a sword-

wielding, spell-casting, bow-firing mediaeval version of Bruce Lee. The aim is to find the Dragon's Eye (which has all sorts of supernatural properties) and return it to the Good Magician within 21 days. The adventurer has certain attributes of strength, intelligence, et cetera although in this game these seem more obscure in their function and derivation than in others.

The action takes place in two areas: on a map of the Seven Provinces (where the user has to work his way around between numbered locations on a network of roads) and on a 'combat screen' where nasty creatures appear when they attack you and where the battles are fought out.

Dragon's Eye is a reasonable blend of design choices. Its map is less flexible than that in Wilderness Campaign, its graphics less exciting than Transylvania and its combat less impressive than Swashbuckler (although it is well enough done). However, it combines elements from all three of these approaches in one packet. It is an order less sophisticated than the magnificent Wizardry series but provides nonetheless an introduction to adventure games that would satisfy the newcomer to the field (and on any machine but the Apple would be faced by far less competition). It is gripping enough to get my 10-year-old shattering the Sunday early morning peace with a cry of, "I got the dragon," but not so good as to get me up to indulge.

Quieter

C. Itoh of Japan is testing dot matrix printers using ink jet and thermal transfer instead of the more usual impact type. The thermal printer uses plain paper and a ribbon using heat as a transfer medium. Sensitised paper is not needed. Models are being developed for both the business and home sections of the market.

"Noise reduction", said Mr K. Miyamoto, of C. Itoh Japan, "is an important consideration in current printer production." High speed with colour and better letter quality are also directions for constant development.

Mr Miyamoto, General Manager, Electronics Division of C. Itoh, was in N.Z. with Mr Hideaki Ochi, from C. Itoh, and Mr Koichi Yagame, of Tokyo Electric Co, Ltd, to attend the opening of Control Microcomputers new premises at Mt Eden.

LANGUAGES, No.2

BASIC: great for quick, short programs

This is the second article in a series on programming languages by GORDON FINDLAY.

If importance is measured by frequency of use, BASIC is the most important for use with micro-computers by a large margin. This month I want to examine some of the features of BASIC, some of the problems with it, and try to determine just why it is so important.

BASIC was invented by John Kemeney and Thomas Kurtz, for use with a large time-sharing system at Dartmouth College, in the United States. At the time (the mid-1960s), communication with a computer was by means of a teletype — no graphics, colour or sound, just (real slow) typing. BASIC reflected the state of the hardware it was designed for use with.

BASIC is, as everyone knows, an acronym for Beginners All-purpose Symbolic Instruction Code. That is, it was intended for use by beginners, learning to program. Why did it become so widespread?

The main "culprit" here is the firm which became Microsoft. It wrote an interpreter for BASIC which could be put into ROM, so that it was immediately available, as soon as the computer was turned on. This interpreter was small enough that the earliest hobby computers, the Altair for example, could use it, even with their very limited memory, simple microprocessors, and limited input and output facilities.

This interpreter, "Microsoft BASIC", has become a sort of de facto "standard", against which others are measured. Once BASIC became established, it became imperative for all manufacturers, who started to appear in profusion, to offer it. After all, nothing succeeds like success. And so BASIC became the first language of almost every computer, and hence the only language of most. Changing the language would require either hardware changes, or loading another into RAM. This is scarcely feasible from tape, and anyway, many didn't have that much memory to spare.

BASIC now comes in a very large number of "dialects". There is an irresistable urge to add to BASIC to allow for such things as graphics, sound, special features of each computer. And that's why, for example, Apple Computer has added commands to the "core" of BASIC to support high and low-resolution graphics.

There is now a distinct division among BASICs. There are those which are close to, or at least similar to, Microsoft, and those which aren't. The most common ones which are not are Sinclair (ZX-series), Hewlett-Packard, and Tarbell BASICs, and CBasic, used in commercial programming. For a bit now I will be writing about Microsoft style BASIC only.

There is a joke among programmers that BASIC is a language designed to train students in keeping track of line numbers! The lines of a BASIC program are all numbered, and the computer automatically ensures that lines are kept in numerical order. Having to remember to type the numbers can be a pain at times, but the purpose is plain — to avoid the use of an editor or word processing program to construct the text of a program.

BASIC is deficient in almost every criterion used by computer scientists to discuss languages. It has little

program structure, has no real data structuring, and allows almost anything. It makes it easy to write rubbish, and almost encourages programmers to write tricky, hard-to-follow code. But it is easy to use, and learn. The use of an interpreter makes program development and debugging straightforward. There is no need to learn about editors, compilers, system libraries, as required by other languages. The beginner can make rapid progress at his keyboard and is able to inspect and modify his programs with a minimum of inconvenience.

Microsoft-style BASIC is available for almost every computer. To name a few, these are some of the family: PET, IBM, BBC and Atari BASICs, Applesoft, TRS80 level 2, MBasic, and BASIC-80.

Compilers are now available for many of the versions of Microsoft BASIC. Often, there are minor differences between the interpreted and compiled forms, but this does allow for maximum of convenience for programming, and gets over, partially at least, the speed limitation imposed by the interpreter.

Other BASICs are often less like Microsoft BASIC than other languages. Versions which do not use line numbers require the use of an editor. This may be an advantage or a disadvantage, depending on your point of view. Some, such as Tarbell BASIC for example, allow the use of subroutines with parameters, and local variables, which can be great advantages, allowing programs to be better structured, and helping programmers to build programs using modules from libraries of sub-routines. Some BASICs add instructions such as REPEAT-UNTIL and WHILE-WEND which make programs easier to read, and therefore to debug. There are probably no two versions of BASIC which are exactly the same!

Originally, BASIC was intended for short programs — of the order of a few lines to a few pages. The universal availability of BASIC has meant that it has been used for quite gigantic programs, such as some accounting packages, data-base software, and so on. BASIC is great for quick, short programs, but begins to show its limitations when big programs are tackled. One thing is for sure — it will be around for a long time yet — until something else which is as easy to learn, and as easy to put into ROM, comes along. Even then, the investment in software, literature and training is so large that we could well have BASIC with us for ever. That might be a good thing.

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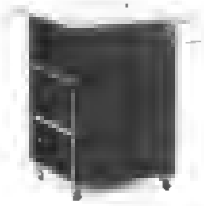

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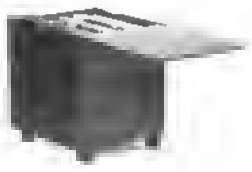

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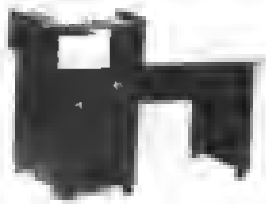

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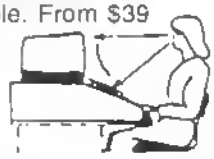

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Machine code saver

By Tony Graham

This is a routine in BASIC, which allows machine code to be saved to tape or disk.

There is no VIC command to allow this to be done unless a machine code monitor cartridge is used, but it is possible to manipulate pointers used by BASIC to achieve the same result.

The "pointers" are memory locations that the VIC uses to keep track of its own operation. By POKEing new values into the pointer locations the VIC can be made to perform many useful tasks.

The advantage of being able to save machine code becomes apparent when you consider the number of LISTings that create machine code by POKEing in DATA.

Each byte of machine code requires between two and four bytes as BASIC DATA, plus a few extra bytes for each line number of the word, DATA, with an additional one or two lines of program to READ and POKE in the data. On each occasion such a program is RUN there is a time delay while the data is loaded.

With the MC SAVER program it is possible to RUN a loader program and save the resultant machine code. The loader program can then be discarded and the memory space it previously occupied becomes free for other use.

The program operates by POKEing new values into the pointer locations for the start and end of memory to be SAVEd, the reLOAD address, the device number and the position of the file name in memory, followed by a SYStem call into the normal SAVE routine.

To use MC SAVER first type in and SAVE the program as listed. Next LOAD the program that creates your machine code. Before RUNning look carefully for the lines that READ and POKE in the DATA, as this gives the address at which the machine code will be located.

A typical loader is used in the Print & routine page 54, Feb 84 of *Bits & Bytes*.

The machine code start and end addresses are found from the lowest and highest values of X in line 15 of that program. Other programs will be similar. Note these addresses then RUN the program. Now type NEW. The memory is not erased although it is lost to BASIC.

Load and run MC SAVER. Enter a file name but do not use quotes. When asked for start address enter the address previously noted; the same applies to the end address. After entering the device number 1 for tape or 8 for disk, MC SAVER will automatically SAVE.

To LOAD tapes made by MC SAVER it is necessary to enter LOAD "File Name" ,1,1 and for disk ,8,1. The additional ,1 is to tell the VIC not to relocate the program but to use the load addresses found on the tape or disk header.

Protection from BASIC is required for programs loaded this way, but how to do this will have to wait for a following article.

```
10 PRINT"[3]NAME OF FILE"
20 INPUT N$
30 INPUT"SAVE FROM ";A
40 GOSUB170
50 POKE178,A:POKE172,L
60 POKE194,A:POKE193,L
70 INPUT"SAVE TO   ";A
80 GOSUB170
90 POKE175,A:POKE174,L
100 INPUT"TO DEVICE   ";A
110 POKE186,A
120 V=PEEK(45)+256*PEEK(46)
130 POKE183,PEEK(V+2)
140 POKE187,PEEK(V+3)
150 POKE188,PEEK(V+4)
160 POKE185,1:SYS(65469):END
170 H=INT(A/256):L=A-H*256
180 RETURN
```

New Commodore user group

By Pat Churchill

An advertisement in *Bits & Bytes* brought forth a couple of dozen inquiries from PET and C64 owners interested in forming a users group.

The initial meeting was held on February 14, and a committee was set up to organise formation of a club.

At a later committee meeting officers were chosen for a six-month period after which another general meeting of members will be held to assess progress and hold a formal election.

The group is planning monthly meetings and will cater for all levels of computer competence. The committee is particularly keen that absolute beginners will join in activities.

There are already nearly 40 Wellington Commodore users on the group's mailing list and committee members have visited various Commodore retail outlets advising of the group's existence and providing contact numbers for new Commodore customers.

For the moment the chairman is Peter March (home telephone, B86-701) and the secretary, Robert Keegan (home telephone, 789-157).

The Wellington Commodore Users Group can also be contacted at P.O. Box 2828, Wellington.

Another group for C64 and Vic 20 users has been started in Wainuiomata and the contact person there is Sharyn O'Hara, telephone 645-830.

64K machine to succeed the VIC 20

By Steven Darnold

The latest news from the United States is that Commodore will soon release a new computer called the 264. It will have 64K RAM and an extended BASIC, including a built-in assembler and special commands for graphics, sound, disk operations, and structured programming. However, don't throw your 64 in the rubbish – the 264 is a replacement for the VIC-20, not the 64.

The VIC-20 has been around for a long time, and its 5K memory and 22 columns have been overtaken by the new crop of inexpensive microcomputers. Moreover, the VIC's primitive Microsoft BASIC compares unfavourably with many of the newer micros. Commodore has responded to these criticisms by giving the 264 a full 60K bytes free, 40 columns, and a huge 32K BASIC. In addition, it has improved the keyboard, and boosted the number of colours to 128.

Commodore 64 owners can be forgiven for thinking that the 264 is better than the 64. However, the 64's advanced graphics and sound are totally lacking on the 264: it has no sprites and no sound synthesiser. For games, in particular, the 264 is no match for the 64. As a result, the 264 will probably be targeted at schools and small businesses, while the 64 continues as the premier home computer.

The 264 will initially sell for about the same price as the 64. However, it is likely that the price of one or the other will fall closer to the level of the VIC. Probably this will be the 64, but not necessarily. After nearly two years of production, the graphics and sound chips in the 64 are still quite expensive to produce. That's why the 264 doesn't use them. In the long run the 264 will probably be cheaper for Commodore to manufacture than the 64. This may result in a lower price for the 264. Interestingly enough, there is a rumour of a 264 with a rubber keyboard and 16K RAM to sell for less than the 16K Spectrum.

At any rate, Commodore 64 owners have nothing to fear from the 264. The 64 is now well established and will continue from strength to strength.

Speech synthesiser

Until this month the only speech synthesiser available for the 64 in New Zealand was the "Type 'N Talk", costing nearly $700. However, thanks to Gadgets in Auckland, we now have a much cheaper alternative: the Alien Group "Voice Box", at $325.

The Voice Box is a solidly built unit that simply plugs into the user port and fits snugly and ubobtrusively against the 64. The little box is completely self-contained. No outside speaker is required and there are no wires to plug in. On the top of the box are knobs to control volume and frequency, and on the side is an output jack for earphones, tape recorder, or external speaker. An external speaker would rarely be necessary; the built-in speaker is more than adequate, even for classroom use.

Full instructions come with the Voice Box on how to produce sounds in BASIC using code numbers. In addition, comprehensive machine-language routines are provided on the tape to convert normal English text to speech. These routines may be appended to BASIC programs. Also on the tape are two sample programs: one that sings a song and one that gives you a spelling test.

The Voice Box produces reasonably clear sound. The K's and hard C's sound like T's, and the G's sound like D's, but otherwise the sounds are recognisable. Sometimes, the irregularities of English fool the text-to-speech routine, but such words can be correctly pronounced by a more phonetic spelling. For example, WORK sounds better when it is spelled WERK.

Two optional disks are available with the Voice Box. The first is a music system which includes 30 pre-

programmed songs and enables you to compose songs for the Voice Box accompanied by music from the 64. This disk costs $80. The second disk is a dictionary system for setting up the exact phonetic equivalents for words. It costs $66. Both disks include a routine to display a high-resolution face, which moves its mouth according to the phonemes. The face occupies the full screen, and the animation is very good.

The material which comes with the Voice Box is compeletely adequate, and there is no need to buy the optional disks. However, the optional disks will be of interest to some people, particularly those intending to use the Voice Box for singing or speaking in public. This would include teachers, advertisers, and computer dealers.

It is likely that in the future many commercial programs for the 64 will use speech synthesis. However, at this stage, it is unclear which speech synthesiser will be supported. The Voice Box, for example, doesn't work with the VIC-20 Adventure cartridges, which support the Type 'N Talk synthesiser. For, although both the Type 'N Talk and the Voice Box plug into the user port, one uses the RS-232 line and the other uses the 8-bit parallel lines. To make matters worse. Commodore will probably release its own speech synthesiser later this year. It is likely that the Commodore synthesiser will be incompatible with both the other two.

Kong

Kong is an interesting game which has recently arrived in New Zealand from Anirog in England. It is being distributed by Alpine on cassette tape, and it costs $24.95.

Kong is a reasonably good copy of the popular arcade game, Crazy Kong. Using the keyboard or joystick, you manoeuvre a little man around a network of girders, jumping obstacles and climbing ladders. If you reach the highest girder, you advance to a new level. There are four levels in all, each with different obstacles to overcome: from conveyer belts to elevators to collapsing girders.

Kong makes good use of the 64's graphics and sound. The colours are bright and clear, and the sounds are generally pleasant and appropriate. Of particular interest is the detail on the animated sprites. The little man, for example, wiggles his nose whenever he jumps over a barrel.

The only significant problem with Kong is that the jumps require exact timing. If you aren't precisely in the right position, you crash and lose a life. This can be very frustrating, until you develop enough skill and experience to jump correctly in every situation. This is not an insurmountable obstacle for keen game players, but some people may find Kong just too demanding.

In some respects Kong is similar to Ape Craze (which I reviewed in December); however, Kong is far superior. Not only does it have better graphics and sound, but it also is much more fun to play. Add to this Kong's significantly lower price, and it's a real winner. I hope we will see many more such high quality programs in New Zealand for under $25.

Moon Buggy

Moon Buggy is another Anirog program sold by Alpine for $24.95. However, it is not nearly as good as Kong.

The main problem with Moon Buggy is that it is fiendishly difficult at the beginning. The craters are difficult to jump, the bombs are difficult to dodge, and the laser bolts are difficult to avoid. Add to this the mines and rocks, and the poor beginner doesn't have a chance. I must have died 50 times before I finally managed to get through the first 10 seconds.

Once you learn to survive, Moon Buggy is not too difficult. However, the obstacles are positioned randomly, and sometimes appear in combinations which are impossible to survive. This is a bad feature. Moon Buggy would be a much better game if the obstacles were positioned according to some plan. Then the game could start easily and progress to more and more difficult combinations.

Moon Buggy makes reasonably good use of bit-map graphics and sprites. Mountains scroll from right to left in the background as the buggy moves realistically in the foreground. In total, the graphics are effective, but somewhat repetitive. The sounds, however, are disappointing: there is no music and there are only a few sound effects.

Joysticks

All of this game playing can be very hard on a joystick. In fact, in the last six months, I have broken two joysticks. It's not surprising. Open up a Commodore, Quickshot, or Atari joystick, and you will find an amazingly flimsy mechanism inside. It's a wonder that these joysticks last as long as they do.

Cheap joysticks are okay for those who only play games occasionally, but hard-core games addicts really need something better. Fortunately, the Wico joystick is available in New Zealand. It costs three times as much as a cheap joystick, but it is so solidly built that it will probably outlast 10 cheap joysticks. In addition, the Wico joystick's precision and reliability usually enhance a player's performance. Before I bought a Wico joystick, my highest score in Jumpman was 108,325. Subsequently, I reached 270,150. What more can I say?

Competition

The winner of February's competition was Aaron Cook, of Upper Hutt. Aaron has been sent a copy of Supercuda (donated by Alpine Computing).

The prize for this month's competition is a cassette tape of Kong. Entries close on 24 April. The winner will be selected randomly from among the correct entries. Only one entry per person.

Your task this month is to write a program which produces six pips, such as those you hear every hour on the radio (YA stations). Send this program with your name and address to Kong Contest, P.O. Box 201, Alexandra.

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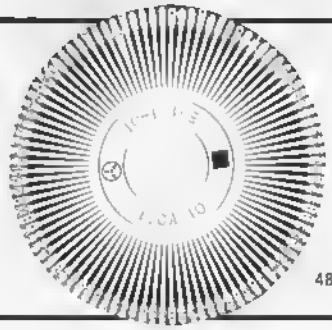

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Improving tape speed

By Gordon Findlay

I hope you have sorted out last month's article by now! It *was* all in order when it left me, but somehow along the editorial trail it got assembled in the wrong order. My apologies, but it really wasn't my fault! *[Last month's column is reprinted in this issue, in right order. — Editor.]*

The inquiries I get suggest that many of the newer, and not so new, users of the '80 would like to use their machines for storing data permanently. For disk users that is fairly straight forward, but the majority, I suspect, are using tape systems still. Storing data on tape is dead easy, but oh so slow!

The reason for the glacial speed is well known. Every time the machine encounters a PRINT #−1 statement, it turns the tape recorder on (if it is a System-80), then writes a 256 byte leader on the tape, which is, for practical purposes, blank. So this short output routine

```
100 FOR I% = 1 TO 10
110 PRINT #-1, I%
120 NEXT I%
```

outputs 10 integers (20 bytes) and 10 leaders (2560 bytes) for a total of 2580 bytes. Only 0.8 per cent of the output is useful!

There are two ways to improve the speed of tape I/O. The first is to rewrite the machine code routines, as is done in some of the sophisticated, anti-piracy loaders to be found in games software. This is a bit beyond us here, but those who would like to 'have a go' may like to know that the tape timing routines in RDM are not optimised. It is possible to read and write tapes on the TRS-80 model I at 1500 baud, three times normal speed. Interchanging tapes between machines becomes more difficult, as tape recorder head alignment becomes critical, but it has been done.

The other way is to buffer input and output. This means holding all the output until enough is accumulated, then writing it all out. Input is the reverse-reading a block, and then splitting it up.

In BASIC, the usual way is to use a buffer array, and to combine elements of the array into a long string. This string can be written to tape, thereby writing many numbers at once.

Converting numbers to strings is easy — use the STR$(function. This converts any number, real or integer, to string form. Negative numbers will have a '−' sign as the first character; positive numbers a space.

The numbers, converted to strings, may be concaterated with '+'. Be careful not to make the result more than 255 characters long — that's the maximum Basic can handle. The result will look something like this:

```
 10 DIM BUFF(...)
 15 .
 20 REM Calculate N numbers, store them
 25 REM in the array BUFF
 30 .
 40 REM Output section
 50 USED = 0 : OP$=""
 60 OP$ = OP$ + STR$ (BUFF(USED))
 70 USED = USED + 1
 80 IF LEN(OP$) > 245 THEN GOTO 100
 90 IF USED >= N THEN GOTO 120 ELSE
GOTO 60
100 PRINT #  1, OP$
110 GOTO 90
120 REM finished — rest of program
```

It is important that you keep count of the number of output strings you produce, so that the same number are input when the data is recalled.

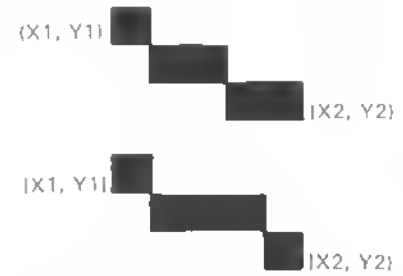
Recall means reading strings, and breaking them into individual numbers, by looking for the blanks or negative signs.

Reprint

The production-staff gremlins got into Gordon Findlay's TRS80/System80 column last month. An illustration was left out and the order of the paragraphs was jumbled. Bits & Bytes apologises to Gordon Findlay and to TRS80/System80 users for the foul-up. Last month's column is here reprinted in, cross fingers, the right order.

Of lines and 'stairs'

One of the problems with TRS-80 graphics is that diagonal lines are not easy to draw. Not only is there a need to calculate which points lie on the line, it is also necessary to decide exactly how the line is to be drawn. I have shown in the diagrams two different sets of "stairs", approximating the same diagonal line between the two points (X1, Y1) and (X2, Y2). Which should be used? Unless the line is at forty-five degrees (exactly) to the horizontal, there is always more than one way of connecting the two endpoints.



Mainframe programmers have, for many years used the technique shown in the listing printed here for approximating a diagonal line:

```
 90 CLS:PRINT X0,Y0,X1,Y1
 95 IF X0 <0 THEN STOP
 99 CLS:GOSUB 100
100 GOTO 10
110 '-----------------------------
120 'subroutine draws a line
130 'joining points (X1,Y1) and
140 '(X2,Y2) no matter where
150 'they are on the screen.
160 '-----------------------------
170 DX=X1-X0
180 DY=Y1-Y0
190 R=DX/2
200 AX=SGN(DX):DX=ABS(DX)
210 SY=SGN(DY):DY=ABS(DY)
220 FOR I=1 TO DX
230 X0=X0+AX
240 R=R+DY
250 IF R>= DX THEN Y0=Y0+SY:R=R-DX
260 SET(X0,Y0)
270 NEXT I
280 RETURN
```

One point is plotted for each X-value between X1 and X2, that is, each time around the loop the value of X changes by 1. The value of Y changes by the SLOPE of the line, which in terms of the subroutine is DY/DX. This value may not be an integer (whole number), so it must be truncated. The subroutine keeps track of the amount of error this introduces, and as soon as this exceeds 1, Y-values are incremented an extra time. The subroutine is confused a little by the need to plot lines from left to right or right to left, and by the fact that the method I just explained only works if the slope is less than 45 degrees. Hence the bother with the SGN(X) function, which is rarely used, but returns 1, -1, or 0 depending on whether X is positive, negative or zero.

To really appreciate the method, add the line

```
195 PRINT @ 0, XO, YO, R;
```

and you will see the way the Y-value is manipulated.

Whether or not the method makes sense, it is very effective, and probably the best that can be done. Naturally it is faster in machine code than BASIC, but if you try it, you will find it isn't that slow even in BASIC. As I say, it is a method which has been around for a long time: I first saw it in 1973. The same technique can be used for moving a ship along a line, or even plotting on a printer.

Gibbins and gold

This game for the 16K ZX81, by Scott French, aged 12, of Hamilton, has the player, depicted by a graphic asterisk, set to find treasure, depicted by a graphic dollar sign, without being caught by a pursuing ghost (a graphic quote mark) or without running out of time, in which case the ground caves in. In both cases it is then GAME OVER.

To help when typing in the program note:

LINE 40: the printing contains 29 graphic A's of the checkerboard-type graphic character.

LINE 150: The printing contains a graphic (inverse) asterisk.

LINE 160: The printing contains a graphic (inverse) quote.

LINES 180 and 270: The printing contains one graphic A as in LINE 40

Program map:

10 set counter to zero
20 clear screen
30–50 set up screen
60 set lives to 6
70 add to counter
80–90 set starting position of 'you'
100–130 set starting positions for ghost and treasure (both random)
140 set time limit loop
150–160 printing 'you' and ghost
170 display space representing ground caves in. 'you' can jump over these as they only serve to indicate how much of the ground has caved in.
180 covers up 'trail' of ghost
190 sees if ghost has caught you
200–210 moves for ghost
220 (same as line 190)
230 prints treasure
240 sees if you have got to the treasure
250 sees if you have run out of 'lives'
260 checks if key was pressed
270 covers your trail
280–290 your movement
300 returns for next turn
310 clears screen
320 sets loop
330 prints at random position an asterisk
340 returns loop
1000–1010 sets loop
1020–1030 prints game over message
1040 returns loop
1050 prints asterisks
1060 returns loop
1070 prints score
1080 returns to print game over message again.

Keys for play

I — up
J — left, K — right
M — down

note: once you have got to the treasure the game loops back to start again.

Our ZX81 editor comments:

By changing lines 280 and 290, different keys can be used to control the game to make it easier for your fingers.

```
 10 LET C=0
 20 CLS
 30 FOR I=1 TO 19
 40 PRINT TAB 1;"
 50 NEXT I
 60 LET L=6
 70 LET C=C+1
 80 LET X=0
 90 LET Y=15
100 LET A=INT (RND*18+1)
110 LET Y=INT (RND*29+1)
120 LET G=INT (RND*18+1)
130 LET H=INT (RND*29+1)
140 FOR T=1 TO 25
150 PRINT AT A,B;"*"
160 PRINT AT X,Y;"
170 PRINT AT RND*18+1,RND*30+1;
"
180 PRINT AT X,Y;"
190 IF A=X AND B=Y THEN LET LI=
L-1
200 LET X=X-(X>A)+(X<A)
210 LET Y=Y-(Y>B)+(Y<B)
220 IF A=X AND B=Y THEN LET LI=
L-1
230 PRINT AT G,H;"$"
240 IF (A=G OR A=G+1 OR A=G-1)
AND (B=H OR B=H+1 OR B=H-1) THEN
GOTO 20
250 IF LI<1 THEN GOTO 1000
260 IF INKEY$="" THEN GOTO 150
270 PRINT AT A,B;"
280 LET A=A+2*(INKEY$="N" AND A
<18)-2*(INKEY$="I" AND A>0)
290 LET B=B+2*(INKEY$="K" AND B
<30)-2*(INKEY$="J" AND B>0)
300 NEXT T
310 CLS
320 FOR J=1 TO 100
330 PRINT AT RND*20,RND*30;"*"
340 NEXT J
1000 FOR X=1 TO 3
1010 FOR Y=1 TO 20
1020 PRINT AT 10,10;"GAME OVER"
1030 PRINT AT 10,10;"GAME OVER"
1040 NEXT Y
1050 PRINT AT 10,10;"*****"
1060 NEXT X
1070 PRINT AT 11,11;"SCORE ";2*I
N (RND*100+1)
1080 FOR Z=1 TO 100
1090 NEXT Z
2000 GOTO 10
```

BOOKS

Complexity made easy

"How to Write a TRS-80 Program" by Ed Faulk, Prentice-Hall, $27.70. Reviewed by Gordon Findlay.

Many people find that even once they know the elements of a programming language, and are comfortable with small programs, they still cannot design a program of any complexity. This book, one of a series for various computers, sets out to show how to design a complex program and how to make the writing as easy and effective as possible.

Many readers will have heard of "structured" programming. The author sets out to describe how to program in a structured way, and how to minimise errors, maximise the ease of debugging and testing, and produce useful, readable documentation. This is undertaken primarily by developing an example program (one for maintaining a reasonably complex set of records about cheque accounts) with the reader looking over the author's shoulder.

The hard part, of course, is actually applying these techniques in practice yourself. The author also gives some very pertinent advice here.

The book is written in a down-to-earth style which is very easy to read. Occasional asides ("Like sex, debugging is not a spectator sport") enliven the book, as do numerous drawings and cartoons. A number of misprints were noted, but none were serious. One diagram (or cartoon?) was missing in my copy.

Thoroughly recommended for all who have written short programs, but not long ones, and those who have written long programs, but not quickly enough.

Shines in parts

"Mastering Visicalc" by Douglas Hergert, Sybex. $26.95. Reviewed by John J. Vargo.

This is a tutorial-based book intended to take you step by step through the original electronic spreadsheet which has given rise to so many "Visi-clones". It covers the different commands of the "language" which gives this software tool its power. The chapters are laid out in an easily understood style which uses simple examples to establish understanding of each command.

Somewhat more attention is given to the mathematical functions available for Visicalc than in the standard manual which comes with the software. Other than this, I did not find the book to have much advantage over the standard manual in explaining the Visicalc commands.

The area where the book does shine is in its emphasis on the use of Visicalc in conjunction with the BASIC programming language via DIF files to solve problems that would be impossible or at least difficult for Visicalc alone. The author has taken the time to give a thorough explanation of DIF files, how to create them and how to use them, calling DIF files from BASIC programs, passing the files back again so that Visicalc can read the files are covered in detail.

Mr Hergert makes the point that Visicalc is only one of a group of productivity and software development tools available to us, and we need to learn to choose the best tool or combination of tools for each application.

A brief introduction and appendix on writing programs in BASIC assumes no prior experience. I don't believe this appendix is a suitable substitute for a fuller treatment of the language, and algorithm design. The author does include a complete BASIC program for sorting a DIF file once it has been read.

This would be a good addition to the library of the serious Visicalc-er, primarily for its discussion of DIF file and interfacing with BASIC.

Promise with more polish

"VIC 20 User Guide" by John Heilborn & Ran Talbott, Osborne/McGraw-Hill, 388pp. $31.40. Reviewed by Steven Darnold.

In recent years, Osborne/McGraw-Hill has released three editions of its very popular "PET User Guide". The first edition was a bit disorganised, but by the time it got to the third edition, it was a very useful book indeed. Now Osborne/McGraw-Hill has turned its attention to the VIC20.

The "VIC 20 User Guide" has profited from the earlier PET editions. Its format is very similar, and it uses many of the same charts and appendices. In addition, new sections have been added to cover the VIC's graphics, sound and game controllers.

Overall, the book provides solid coverage of the computer and its main peripherals. However, like the first PET edition, it really needs further polishing.

The sections written especially for the VIC are not as clear as those inherited from the PET editions. Moreover, in some sections the balance is wrong: a few topics are given redundant coverage while others are inadequately dealt with. Add to this some significant typograhical errors, and the book would profit from a thorough revision.

However, it compares favourably with other reference books for the VIC. It is better than "VIC Revealed" and is probably more useful for the beginner than the "Programmer's Reference Guide". However, I do hope Osborne/McGraw-Hill brings out a second edition.

Accessible ready reference

"The Timex/Sinclair 1000 BASIC Handbook" by Douglas Hergert, Sybex, 164pp. $17.95. Reviewed by Stephen Baker.

This book contains, alphabetically, all the ZX-81/Timex 1000 8ASIC keywords and function keys.

Each entry heading gives the name of the keyword or function, together with its entry mode and the key on which it is located. Most entries are then organised into the following sections:

- a description telling what the keyword/function does and how to use it correctly in a program.
- a sample program and an explanation of how it works using that particular 8ASIC word.
- a copy of the screen display and results of that program.
- "notes and comments" – interesting tips and practical uses of the particular 8ASIC word.

Also included are definitions of various commonly used words and phrases of computer jargon.

All explanations are easy to follow and the sample programs allow you to try them for yourself so that you can see how they work.

This would be a very handy addition to any ZX81/Timex 1000 owner's library. Whether you are just beginning to write your own programs or fairly experienced, it will provide a ready reference to all 8ASIC keywords and functions in one easy-to-use book.

New lap machine

The dynamism of the Japanese computer industry is reflected in the confidence and drive of Mr Takayoshi Shiina, president of the Sord Computer Corporation of Japan, who was in New Zealand last month.

He was brimful of news about new and forthcoming models and excited about his latest venture, which is into a cable television/home computer network with a big Japanese private railway company. This will take Japan a big step towards being perhaps the world's first wired society.

The railway company had the idea of diversifying into a cable network which could carry television programs and personal-computer data when it considered how it could make better use of the communications links which serve its network of railways. Now it and Sord will interchange shares. In it for Sord is the possibility of an order for a million visual display units.

With him in New Zealand, Mr Shiina had Sord's new lap-computer, the IS11, similar to the type put out by Casio and Tandy, and a generation ahead of the Epson which pioneered the field. The IS11, with 32K of CMOS RAM enabling it to be run from torch batteries, 64K of RAM, PIPs, a word processor in ROM, a RS232 port, and a printer port will sell in New Zealand for about $2000, full-tax paid. (This will be reviewed in *Bits & Bytes* next month).

Mr Shiina has high hopes that the popularity of lap computers will spread from businessmen who can use it on planes, and while commuting, to education. Sord is pioneering this field, he says, by putting out microcassettes for the IS11 which, on one side, have instructions on using the machine. These are listened to when the microcassette is played on a recorder/player. On the other side of the tape is computer data to be fed into the IS11 itself.

Sord believes that this dual use would be excellent for correspondence education: pupils could listen to instruction and then work through program examples.

The Japanese corporation will be bringing out a 16-bit, 128K machine, about October, which when it reaches New Zealand may sell for as little as $1200 or $1300. Mr Shiina also promised soon a new machine fully compatible with the IBM PC.

Sord is producing a wide range of micros. It is still pushing its own system PIPs, but increasingly the machines will be offered with other options, such as MS-DOS and CP/M, but surprisingly, not the new Japanese "standard" MSX.

Sord, founded by Mr Shiina 14 years ago with a capital of $2000 that he had

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GLOSSARY

Acoustic computer: Connects the RS232 part of a microcomputer to a telephone handpiece.

Algorithm: A list of instructions for carrying out some process step by step.

Applications program: A program written to carry out a specific job, for example an accounting or word processing program.

Array: A data type found in high level languages, which is stored in a contiguous block of memory. Accessed by the array name and an index making it easier to process groups of data in many situations.

ASCII: American Standard Code for Information Interchange. An 8-bit code.

BASIC: Beginners' All-purpose Symbolic Instruction Code. The most widely used, and easiest to learn, high level programming language for microcomputers.

Baud: Speed of transferring data, measured in bits per second.

Beeb: The BBC microcomputer.

Binary: The system of counting in 1's and 0's used by all digital computers. The 1's and 0's are represented in the computer by electrical pulses, either on or off.

Bit: Binary digit. Each bit represents a character in a binary number, that is either a 1 or 0. The number 2 equals 10 in binary and is two bits.

Boot: To load the operating system into the computer from a disk or tape. Usually one of the first steps in preparing the computer for use.

Bubble memory: A non-volatile memory (i.e., it is not erased when the power is turned off). The information is stored as microscopic pieces of magnetic polarisation.

Buffer: An area of memory used for temporary storage while transferring data to or from a peripheral such as a printer or a disk drive.

Bug: An error in a program.

Byte: Eight bits. A letter or number is usually represented in a computer by a series of eight bits called a byte and the computer handles these as one unit or "word".

CAL: Computer Aided Learning. CAL programs are written to take different actions on different student answers.

CCIT: An abbreviation for International Telegraph and Telephone Consulting Committee.

Computer language: Any group of letters, numbers, symbols and punctuation marks that enable a user to instruct or communicate with a computer. See also Programming languages and Machine language.

Courseware: Name for computer programs used in teaching applications.

cpi: Means characters per inch. A common way of describing character density, i.e., how close together characters are in printers.

CP/M: An operating system for Z80 based machines. It is by far the most widely used DOS for Z80 based machines and there is an extremely large software base for it. See also disk operating systems.

cps: Characters per second. A common way of describing speed in printers.

Cursor: A mark on a video that indicates where the next character will be shown, or where a change can next be made.

Data: Any information used by the computer either I/O or internal information. All internal information is represented in binary.

DC: Direct coupling (telecomputing); or direct current.

Disk: A flat, circular magnetic surface on which the computer can store and retrieve data and programs. A flexible or floppy disk is a single 8 inch or 5¼ inch disk of flexible plastic enclosed in an envelope. A hard disk is an assembly of several disks of hard plastic material, mounted one above another on the same spindle. The hard disk holds up to hundreds of millions of bytes – while floppy disks typically hold between 140,000 and three million bytes.

Disk drive: The mechanical device which rotates the disk and positions the read/write head so information can be retrieved or sent to the disk by the computer.

Diskette: Another name for a 5¼ inch floppy disk.

Disk operating system: A set of programs that operate and control one or more disk drives. See CP/M for one example. Other examples are TRSDOS (on TRS 80) and DOS 3.3 (for Apples).

DOS: See disk operating system.

Dot matrix: A type of print head, made up of a matrix of pins, e.g. 8x8. When a character is to be printed the appropriate pins push out and strike the ribbon to paper forming the character.

Dot graphics: These graphics are individual screen pixels. Used by either turning on or off one pixel.

Double-density: Floppy drives that store twice the standard amount of data in the same space.

Dump: Popular term for sending data from a computer to a mass storage device such as disks or tape.

EPROM: Erasable, user-programmable, read-only memory.

Execute: A command that tells a computer to carry out a user's instructions or program.

Fanfold: A type of paper that although a continuous sheet folds into set length sheets. This is achieved by way of a perforated line at set intervals. It also makes it easy to tear off a length of paper.

File: A continuous collection of characters (or bytes) that the user considers a unit (for example on accounts receivable file), stored on a tape or disk for later use.

Firmware: Programs fixed in a computer's ROM (Read Only Memory); as compared to software, programs held outside the computer.

Floppies: Thin plastic disks with a magnetic coating used for storing information. Called floppies because they are flexible.

Friction feed: A type of paper-feeding system for printers: normal paper in a continuous sheet is gripped between two friction rollers as on a typewriter.

Hardware: The computer itself and peripheral machines for storing, feeding in and printing out information.

Hex: Abbreviation for hexadecimal notation, a base-16 numbering system convenient to use with computers.

High-level language: Any English-like language, such as BASIC, that provides easier use for untrained programmers. There are now many such languages and dialects of the same language (for example MicroBASIC, PolyBASIC etc).

Input: Any kind of information that one enters into a computer.

Interactive: Refers to the "conversation" or communication between a computer and the operator.

Interface: Any hardware/software system that links a microcomputer and any other device.

I/O "Input/output".

Inverse video: When the background is coloured; e.g. on a black and white screen white becomes background and characters are written in black.

K: The number 1024. Commonly refers to 1024 bytes. Main exception is capacity of individual chips, where K means 1024 bits

Kilobyte (or K): Represents 1024 bytes. For example 5K is 5120 bytes (5 x 1024).

LCD: Liquid-crystal display.

Laser: Light amplified by stimulated emission of radiation. In computing chiefly in printing, where a laser can form characters on paper. Also in the reading of video-disks, a future storage medium for micros.

Line feed: A control code character found in the ASCII character set. Its normal purpose is to move the cursor down one line (on screen) or move paper up one line (on printer). Does not return the cursor to the left-hand margin.

Machine language: The binary code language that a computer can directly "understand".

Mainframe: The very large computers that banks and other large businesses use are called mainframes. Also in microcomputers the term is sometimes used to describe the core of the machine, i.e. the CPU plus memory.

Mass storage: A place in which large amounts of information are stored, such as a cassette tape or floppy disk.

Megabyte (or Mb): Represents a million bytes.

Memory: The part of the microcomputer that stores information and instructions. Each piece of information or instruction has a unique location assigned to it within a memory. There is internal memory inside the microcomputer itself, and external memory stored on a peripheral device such as disks or tape.

Memory capacity: Amount of available storage space, in Kbytes.

Menu: List of options within a program that allows the operator to choose which part to interact with (see Interactive). The options are displayed on a screen and the operator chooses one. Menus allow user to easily and quickly get into programs without knowing any technical methods.

Microcomputer: A small computer based on a microprocessor.

Microprocessor: The central processing unit or "intelligent" part of a microcomputer. It is contained on a single chip of silicon and controls all the functions and calculations.

Modem: Modulator-demodulator. An instrument that connects a microcomputer to a telephone and allows it to communicate with another computer over the telephone lines.

Network: An interconnected group of computers or terminals linked together for specific communications.

Output: The information a computer displays, prints or transmits after it has processed the input. See input and I/O.

Parallel interface: A type of communications interface used mostly for printers. It sends a whole character of data down eight (commonly) lines, one bit down each line. The most common type of parallel interface for printers is the centronics interface.

Pascal: A high-level language that may eventually rival BASIC in popularity.

PEEK: A command that examines a specific memory location and gives the operator the value there.

Peripherals: All external input or output devices: printer, terminal, drives etc.

Phreaking: Breaking into guarded computer systems via telephone links.

Pixel: Picture element. The point on a screen in graphics.

POKE: A command that inserts a value into a specific memory location.

Program: A set or collection of instructions written in a particular programming language that causes a computer to carry out or execute a given operation.

RAM: Random access memory is the very last memory inside your computer. The access time for any piece is the same. Your program and run-time data are usually stored in RAM.

REM statement: A remark statement in BASIC. It serves as a memo to programmers, and plays no part in the running program.

Resolution: A measure of the number of points (pixels) on a computer screen.

ROM: Read only memory. Any memory in which information or instructions have been permanently fixed.

Serial interface: A type of communications interface used for a wide variety of purposes (printers, terminals, telephone connection etc.). It uses a minimum of two wires, and sends the data one bit at a time down one wire. The most common type of serial interface is RS232C.

Sheet feed: A type of paper feeding system normally used for high-quality document printers. A special device picks up a sheet of paper and feeds it into friction rollers.

Simulation: Creation of a mathematical model on computers that reflects a realistic system.

Software: Any programs used to operate a computer.

Sysop: Systems operator. Person(s) who runs a bulletin board.

System: A collection of hardware and software where the whole is greater than the sum of the parts.

Tractor feed: A type of paper feeding system for printers. Special computer paper with holes along both sides is fed by the tractors gripping these holes.

TTL: An abbreviation for transistor-transistor logic.

VDU: Visual display unit. A device that shows computer output on a television screen.

Word: A group of bits that are processed together by the computer. Most microcomputers use eight or 16 bit words.

SORD

From page 58

borrowed, had sales of about $140 million in the year to February 20. Mr Shiina expects growth to continue 25 to 30 per cent over the next 10 years.

He sees technical spin-offs coming for the Japanese microcomputer industry from the country's quest for the fifth-generation computer technology, and from developments such as optical-disk (video-disk) technology, which he expects will provide greatly increased external storage and faster access.

CLASSIFIEDS

Addresses wanted: Bits & Bytes would like the following contributors who supplied material without their addresses to write to the editor: D. Montgomery and Peter Passuello.

FOR SALE — System 80 (48K), 9" monitor, and Sharp PC1211 pocket computer with printer. Phone 63-172 Dunedin after 5pm.

C-64 PROGRAM: "Mail-book". Store Address Data. $10. Write D. Lynch RD4, Wellsford. Ph: 5122 WFD.

TRS-80/System 80 M/C Game "Drakula" 16K or 32K tape version only $15. Send to RMB Software, 141 Winchester Street, Levin.

"SYSTEM 80 FOR SALE — Blue Label with inbuilt colour board, 2 disk drives (X-4060/1), 32k expansion unit (X-4020), and Sword green screen monitor. Will also sell large quantity of software, manuals and books. Contact P. Dodge, 143 Main Street, Greytown. Phone Greytown 49-528.

FOR SALE ZX81 second hand software, 1 and 16K. Also moving keyboard. Please write J. Walker, 2 Arthur Street, Oamaru.

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COMPUTER RAM PACK — 8K Ram for Sharp PC1500. Cost $200. Sell $100. Phone 358-774 Porirua.

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HANDHELD COMPUTER: Sharp PC 1211 with printer. New Price $704. Almost new with programming books, $375 ono. Write to Phillip C/o Box 121 Napier or Phone 447-224 Napier.

WANTED: System 80 Technical Manual to buy or borrow. Contact Brian Wood, 30 Betley Cres, Hamilton. Phone HN 59-098 pte, HN 492-872 or Auckland 592-759 bus.

Z80/Z80A machine code programmers wanted to "translate" our clients' existing games to run on Spectravideo, Colour Genie and VZ200 for developing markets. Sorry, no fortunes yet — but very worthwhile returns for spare-time work. Please send details of your experience in confidence to Dave Delmont, Redeployment Services, 21 Meadow Road, Pinner, Middx, HA5 1EB, England.

"Sinclair ZX81 Software: Would like to exchange 16K games and business software. Phone Michaela 439-777 Auckland.

FOR APPLE II — Video keyboard enhancer. Gives full keyboard, with user macros $140. Also PAL colour card $100. Ian Jackson, Cashmere High School, Christchurch. Ph: 39-129, AH 487-452.

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FOR SALE — Sharp PC 1500 Portable Computer, 11.5K Ram, with CE150 Printer and Cassette Interface, $495 also Sony Portable Tape Recorder for Programs, $95. Phone Auckland 292-4773 or Write to P.O. Box 529, Papakura.

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The Doodler, a machine code drawing, painting, writing programme for the 48K Spectrum. $16.00 including postage. Send cheques or money order to Tysnn Computing, 124 Hukanui Road, Hamilton. Trade enquiries welcome.

FOR SALE — EasyScript 64 wordprocessor for Commodore 64. All new. Manual and disks, $95. Phone Blenheim (057) 81-809.

FOR SALE — Radio Shack ANSI 74 Cobol Compiler. Retail $550. Sell $300. T. Mackrell, Ph: Tokomaru Bay 455.

NEC PC-8000 Computer. Includes dual disk drives, and a high resolution RGB colour screen. $2800 ono. Ph: 596-249 Christchurch.

Mystery back copy order — would the person who ordered 10 back copies with a Visacard number but didn't include their name and address please contact BITS & BYTES. P.S. The person also owns a VIC 20.

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